FibroMinn
a CONTOURGLOBAL company

Fibrominn Power Plant
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August 20, 2013

Ms. Sara Breneman
Chief
Air Enforcement and Compliance Assurance Branch
U.S. Environmental Protection Agency
77 W. Jackson Blvd., AE-17J
Chicago, Illinois 60604

Submitted Electronically to Ms. Breneman through Ms. Margaret Sieffert, Regional CISWI Rule Lead, U.S. EPA Region V, at Sieffert.Margeret@*epa.gov*

Subject: Fibrominn Biomass Power Plant, Benson, MN
(MPCA Air Permit No. 15100038)

Notification Under 40 CFR 60.2020 of Exemption from the CISWI Rule as a QF Burning a Homogeneous Waste Fuel

Dear Ms. Breneman:

This letter serves as Notification pursuant to 40 CFR 60.2020(e) that the Fibrominn Biomass Power Plant operating in Benson, Minnesota is a Qualifying Facility (QF) that is exempted from regulation under the CISWI Rule as a small power production facility burning a homogeneous waste material; i.e., poultry litter, to produce electricity. In the specific context of 40 CFR 60.2020(e), the principal fuel used by the Fibrominn facility, poultry litter, meets the definition of a homogeneous waste material, although poultry litter can potentially be re-classified as a non-waste material under other U.S. EPA regulations. Following background discussion below, the formal Notification is made and related documentation is presented.

BACKGROUND

Fibrominn LLC owns and operates the 55-MW Fibrominn Biomass Power Plant ("Fibrominn Plant") in Benson, Minnesota, which has been inoperation since 2007. The grid-connected Fibrominn Plant is fuelled principally with poultry litter obtained from poultry producers who grow turkeys and chickens in Minnesota. Poultry litter is a biomass material comprised of only two components: dried poultry droppings and poultry bedding material, typically, wood shavings. While the Fibrominn Plant combusts poultry litter as its principal fuel, it also co-

combusts vegetative biomass (typically, wood chips) as a secondary biomass fuel. Historically, the majority fraction of the fuel mix has been poultry litter, a 50% to 75% fraction.

Under 40 CFR Part 241, U.S. EPA presently considers animal manure categorically to be a secondary non-hazardous material that is a solid waste material when combusted. This would include poultry manure, and hence, poultry litter containing poultry manure as a constituent. Accordingly, combustion of poultry litter at the Fibrominn Plant would presumptively be regulated by EPA under the Commercial-Industrial Solid Waste Incinerator (CISWI) Rule, promulgated in final form by EPA on February 7, 2013 [78 FR 9112-9213]. The vegetative biomass that is used as a secondary fuel is classified by EPA a "clean cellulosic biomass fuel," and hence, is not a waste material when combusted.

NOTIFICATION OF EXEMPTION FROM CISIW UNDER 40 CFR 60.2020(e)

Section 129 of the Clean Air Act (CAA) regulates combustion of solid waste materials, but in certain circumstances exempts waste combustion from regulation under Section 129. Per CAA Section 129(g)(1)(B), one such exemption from regulation under Section 129 is for qualifying small power production facilities that burn a homogeneous waste for the production of electric energy. Specifically, CAA Section 129(g)(1)(B) states that "- - the term 'solid waste incineration unit' does not include - - - qualifying small power production facilities, as defined in section 796 (17)(C) of title 16 - - - which burn homogeneous waste (such as units which burn tires or used oil, but not including refuse-derived fuel) for the production of electric energy - -."

Pursuant to Section 129 as above, the CISWI Rule at 40 CFR § 60.2020 exempts certain types of combustion facilities from regulation under the Rule. One such exemption from regulation under the CISWI Rule is granted to small power production facilities meeting three requirements given at 40 CFR § 60.2020(e) as follows:

> *(e) Small power production facilities. Units that meet the three requirements specified in paragraphs (e)(1) through (3) of this section.*
>
> *(1) The unit qualifies as a small power-production facility under section 3(17)(C) of the Federal Power Act [16 U.S.C. § 796(17)(C)].*
>
> *(2) The unit burns homogeneous waste (not including refuse-derived fuel) to produce electricity.*
>
> *(3) You notify the Administrator that the unit meets all of these criteria.*

This letter constitutes Notification to the EPA Administrator under 40 CFR § 60.2020(e) that the Fibrominn Plant is a small power production facility that burns a homogeneous waste to recover meaningful energy, and meets all three requirements under 40 CFR § 60.2020(e) for exemption from regulation under the CISWI Rule. The bases for Fibrominn's poultry litter fuel meeting the three exemption criteria at 40 CFR § 60.2020(e) are summarized as follows:

1. *The unit qualifies as a small power-production facility under section 3(17)(C) of the Federal Power Act [16 U.S.C. § 796(17)(C)]*

   In 2004, the owner of the Fibrominn Plant filed Form 556 with FERC to self-certify as a Qualifying Facility (QF), specifically, a small power production facility combusting biomass fuel. Because of a subsequent change in plant ownership, a QF Re-Certification was filed with FERC in 2009. The FERC docket number is QF05-26-000. Both the 2009 and 2004 QF certification documents are included in Appendix A to this Notification.

2. *The unit burns homogeneous waste (not including refuse-derived fuel) to produce electricity.*

   The bases on which the Fibrominn Plant's poultry litter fuel is determined to be a homogeneous waste material for the specific purposes of 40 CFR § 60.2020(e) are summarized here, and those bases are documented in further detail in a subsequent section.

   - The poultry litter is a material of known origin and can be identified as a specific material or materials. The poultry litter fuel is procured, always under contract, from poultry producers in Minnesota, and hence, is of known origin. Poultry litter is a material that is readily and uniquely identifiable to those familiar with it; i.e., poultry producers and those who use the poultry litter as a fertilizer product or as a fuel. The poultry litter is physically comprised of a mixture of only two components, each of which is demonstrably a specific, identifiable material. The two constituent components are dried poultry manure (which is digested feed grain) and poultry bedding material (which is clean wood shavings).
   - The contaminant levels present in the poultry litter are at known and predictable levels, and the variability of contaminant levels has been robustly quantified. Fibrominn has developed an extensive data base of the mean levels and ranges of contaminant levels present in the poultry litter it burns as a fuel, as well as for poultry litter generally on a national basis. The contaminant levels present in poultry litter have been demonstrated to be comparable to levels present in traditional fuels. With the mean and range values of contaminants present in poultry litter having been robustly quantified, this enables enforcement authorities to predict the range of emissions from the combustion of the poultry litter on an ongoing basis.
   - The poultry litter is demonstrated, per EPA guidance, "... to be within the range of operations which produce the waste (e.g., size, contaminant levels, state of matter.)" The poultry litter is always in the solid state. In addition, while poultry litter is comprised of particles that can vary in size, the size range is inherently limited, enabling the poultry litter to be used as a fuel with little to no mechanical pre-processing for size reduction. Further, as just noted above, the contaminant levels in poultry litter do vary, but the contaminants present and the ranges of their variation are known quantitatively,

enabling regulators to determine the likely range of associated emissions when the poultry litter is combusted.

- The poultry litter is not adulterated with contaminants that transform it into another type of waste, as occurs for example, when used oil becomes heavily contaminated with PCBs. Nothing is added to poultry litter, or to either of its two components (dried poultry manure and clean wood shavings) that would result in the poultry litter being adulterated with contaminants that transform it into another type of waste.
- The poultry litter has sufficient heating value (HHV) to burn autogenously (that is, without using supplemental fuel) and to serve the purpose of energy recovery. Since startup in 2007, the Fibrominn Plant has established a strong commercial operating record demonstrating that it can combust ~ 400,000 tons per year of poultry litter as the principal fuel, profitably generating over 400,000 MWh annually of electric power that is sold on the grid.

3. *You notify the Administrator that the unit meets all of these criteria.*

   Again, this letter constitutes Notification to the EPA Administrator that the Fibrominn Plant is a small power production facility that burns a homogeneous waste to recover meaningful energy, and meets all three requirements under 40 CFR § 60.2020(e) for exemption from regulation under the CISWI Rule.

REGULATORY BACKGROUND ON THE "HOMOGENEOUS WASTE" CRITERION

In this section, the guidance that EPA has provided regarding the meaning of "homogeneous waste" is summarized, as that term relates to exemption from regulation under the CISWI Rule, pursuant specifically to 40 CFR § 60.2020(e)(2). In the final CISWI Rule promulgated on February 7, 2013, EPA addressed the meaning of homogeneous waste as follows [78 FR 26, p. 9124]:

- EPA removed the definition of "homogeneous waste" it had previously established, leaving the term presently without a formal regulatory definition.
- EPA eliminated a previously-imposed requirement that qualifying small power producers combusting solid waste obtain a case-specific determination from EPA that such waste is homogenous, in order to qualify for the exemption from the CISWI Rule. In the amended CISWI Rule, EPA substituted a requirement for qualifying small power producers that combust solid waste to notify the EPA case-specifically that such waste is homogeneous.
- While EPA declined to define homogeneous waste in the final CISWI Rule, it did provide related guidance for use in determining whether a waste material is homogeneous or not in the context of CAA Section 129:
  - "- - - homogeneous wastes are generally material specific (e.g., tires or used oil). We believe this means that a homogeneous waste is of known origin and that it can be

identified as a specific material or materials—using the example in the Act, certain used oils or scrap tires. By contrast, municipal solid waste can be identified as municipal solid waste as a general term, but it is not composed of only one or two specific type of waste; e.g. municipal solid waste cannot be identified as one specific material or group of materials."

- "Congress intended the [homogeneous waste] exemption to apply only when the waste stream has a consistent makeup that allows the source and the enforcement authority to predict the range of emissions from the combustion of the waste on an ongoing basis."
- "Regarding variability of the composition of homogeneous waste throughout, homogeneous waste may have variations in composition, but it should generally be within the range of operations which produce the waste (e.g., size, contaminant levels, state of matter.)"
- "We also believe that homogeneous waste should have predictable known contaminant levels, even if those contaminant levels vary within a range."

- EPA cited two examples of circumstances when it could determine a waste material to be inhomogeneous:
  - When the "- - - material - - - is adulterated such that it takes on the characteristics of a different type of waste (e.g., used oil which is so contaminated with PCB's from a leaking heat exchanger, such that the used oil takes on the characteristics of a waste PCB stream as opposed to a used oil stream) - - -."
  - When "- - - the BTU value of a waste is so altered that other fuels must be introduced to ensure combustion and preserve the purpose of combustion under the exemption, i.e. to produce energy."

BASIS FOR NOTIFICATION THAT POULTRY LITTER IS A HOMOGENEOUS WASTE

In this section, the bases are documented for this Notification that the poultry litter combusted at the Fibrominn Plant is a homogeneous waste material, pursuant specifically to 40 CFR 60.2020(e). The documentation is keyed to the EPA guidance summarized above relative to making homogeneous waste determinations. In documenting below the basis for this Notification, reference is made to the application (petition) that Fibrominn has made to EPA Region V on July 1, 2013 for a non-waste determination for the poultry litter material it combusts as a fuel, pursuant to a different EPA regulation at 40 CFR 241.3(c). That document, included for reference as Appendix B to this Notification, will be referred to here as the "Fibrominn non-waste petition."

A. Homogeneous waste is of known origin and can be identified as a specific material or materials.

Of Known Origin

The poultry litter combusted at the Fibrominn Plant is of known origin. As detailed in the Fibrominn non-waste petition (see Appendix B), Fibrominn procures its poultry litter fuel directly from poultry producers based in Minnesota, and always via fuel supply contracts. To ensure a consistent fuel supply, Fibrominn procures poultry litter fuel through both long-term contracts and short-term "spot" procurements. The fuel supply contracts are directly between Fibrominn and the poultry producer generating the poultry litter fuel. Both the long-term and spot contracts contain a fuel specification that is intended to ensure that the litter has adequate fuel quality and is low in contaminants.

Poultry litter fuel handling begins with removal of the litter from the poultry grower's barn, following the completion of a poultry growing cycle. The litter is removed by the grower, or by a Fibrominn contractor, using a front-end loader or loader conveyor system. The litter removed from the barn is loaded directly into trucks and is normally transported the same day to Fibrominn. Ownership of the litter transfers from the grower to Fibrominn when the litter is loaded into the truck at the poultry farm. The origin of the poultry litter material, as well as the chain of custody of the poultry litter from the litter generator to the Fibrominn Plant, are both explicitly known.

Identified as a Specific Material or Materials

In terms of composition, poultry litter is physically comprised of a mixture of only two components, each of which is demonstrably a specific, identifiable material. The two constituent components are dried poultry manure and poultry bedding material. The specific, identifiable materials comprising poultry litter contrast with the heterogeneous composition of some other waste materials used as a fuel, such as municipal solid waste (MSW) and unsorted construction and demolition waste (C&D waste). Unlike poultry litter, MSW and unsorted C&D waste can be comprised of numerous constituent materials that are present in highly variable fractions, making their identification difficult.

While EPA considers the poultry manure component of poultry litter to be a presumptive waste material, EPA considers the bedding material component (wood shavings) *by itself* to be a non-waste material. As detailed in the Fibrominn non-waste petition, EPA considers the bedding material component (wood shavings) to be specifically a form of "clean cellulosic biomass" fuel, which is inherently homogeneous. Accordingly, the relevant issue is whether the dried poultry-manure component of poultry litter is a homogeneous waste material, and hence, whether poultry litter, a dried mixture of the manure and bedding-material components, is also a homogeneous waste material as well.

The dried poultry manure component of poultry litter is demonstrably a specific, identifiable, homogeneous waste material. Poultry manure is essentially grain that has been biologically processed via digestion. Poultry feed is grain-based. The poultry litter used by the Fibrominn Plant as a fuel comes from regional poultry growers whose poultry feed typically has the following constituents, in descending order of composition fraction:

- Grains (corn, soybean)
- Processed grain (soybean meal, distillers grain, bakery meal)
- Dietary grit (bonemeal, ground shells)
- Dietary calcium and phosphorous nutrients
- Salt

The poultry manure component has a consistent identifiable composition, namely that of dried, digested feed grain. Regarding physical state, the poultry manure component is consistently in the solid state, because excreted manure dries in the poultry barn over the duration of the birds' several-month growing cycle, due to both natural air convection and forced ventilation of the barn.

The two components of the poultry litter, the dried poultry manure component (considered a presumptive waste material by EPA) and the bedding material component (a presumptive non-waste material), are each demonstrated to be specific, identifiable, homogeneous materials. The poultry litter used as fuel at the Fibrominn Plant, a mixture of these two homogeneous materials, is also a presumptive waste material that is a specific, identifiable, homogeneous waste material pursuant to 40 CFR § 60.2020(e). The attributes of the poultry litter that make it a specific, identifiable waste material are as follows:

- The poultry litter material is always in the dried, solid state.
- As noted above, the poultry litter is a composite material comprised of only two components, dried poultry manure and poultry bedding material, each of which is a specific, identifiable material. The dried poultry manure component has a uniform composition, namely that of dried, digested feed grain. The poultry bedding material component also has a uniform composition, that of clean wood shavings.
- The poultry litter itself is a uniquely identifiable, dried, composite material that again, is comprised only of dried poultry manure and wood shavings. Because of its unique physical appearance, poultry litter is readily identifiable, specifically as such by any party who is familiar with it, including poultry growers, farmers who use it as fertilizer, and the operators of the Fibrominn Plant who use it as the principal fuel. By analogy, bagasse, which is sugar cane processing residue that is used as a specialty fuel, has a unique physical appearance as well, but is a readily identifiable material to those familiar with it.

- The poultry litter is comprised of solid particles within a limited size range, enabling the poultry litter to be handled and combusted as a fuel, with minimal, if any, mechanical pre-processing needed to assure a proper fuel "particle size."

B. For waste to be homogeneous, it must have a consistent makeup, enabling the enforcement authority to predict the range of emissions from the combustion of the waste on an ongoing basis. This means that homogeneous waste should have predictable known contaminant levels, even if those contaminant levels vary within a range.

As documented in the Fibrominn non-waste petition (see Attachment B), Fibrominn has quantified both the mean values and the range of values of contaminants present in the poultry litter it combusts as a fuel, based on extensive laboratory testing data. In addition, Fibrominn has quantified the mean values and ranges for contaminants present in poultry litter generally, based on research of literature values nationally. Mean values and ranges were quantified for the following contaminants and air pollutant precursors: nitrogen, chlorine, fluorine, arsenic, mercury, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, selenium, and zinc.

Although the contaminant levels vary in poultry litter, Fibrominn has numerically delineated the range of that variation. Accordingly, Fibrominn's poultry litter has the homogeneous waste attribute of having ". . . predictable known contaminant levels, even if those contaminant levels vary within a range." With the mean and range values of contaminants present in poultry litter having been quantified from a robust data base, this enables enforcement authorities to predict the range of emissions from the combustion of the poultry litter on an ongoing basis.

After quantifying the means and ranges of the contaminants present in poultry litter, Fibrominn then compared those contaminant levels with the means and ranges present in a number of traditional fuel materials that Fibrominn's stoker boiler system is also capable of burning: coal, petroleum coke, tire-derived fuel (TDF), wood chips, distillers dried grain with solubles (DDGS), corn stover, and alfalfa stems. For each and every contaminant, the levels present in poultry litter, including the Minnesota poultry litter that Fibrominn burns as a fuel, were demonstrated to be numerically comparable to or less than levels present in one or more of the traditional fuel materials.

C. Homogeneous waste may have variations in composition, but it should generally be within the range of operations which produce the waste (e.g., size, contaminant levels, state of matter.)

It was noted above that the poultry litter is always in the solid state. It was also noted that, while poultry litter is comprised of particles that vary in size, the size range is inherently limited, enabling the poultry litter to be used as a fuel with little to no mechanical pre-processing for size reduction. Further, it was noted above that contaminant levels in poultry litter do vary, but the contaminants present and the ranges of their variation are known quantitatively, enabling regulators to determine the likely range of associated emissions when

the poultry litter is combusted. Finally, it was noted that the contaminant levels present in poultry litter were demonstrated to be consistent with levels found in materials that EPA deems to be non-waste fuel materials.

D. Homogeneous waste is not adulterated with contaminants that transform it into another type of waste.

As stated above, poultry litter is physically comprised of a mixture of only two components, each of which is demonstrably a specific, identifiable material. The two constituent components are dried poultry manure (i.e., digested feed grain) and poultry bedding material (clean wood shavings). Nothing is added to poultry litter, or to either of its two components (dried manure and wood shavings) that would result in the poultry litter being adulterated with contaminants that transform it into another type of waste.

Some poultry growers add a small amount of an arsenic compound to poultry drinking water or poultry feed to prevent parasitic infections in the birds. Accordingly, small levels of arsenic can be present in poultry manure, and hence, in poultry litter. As detailed in the Fibrominn non-waste petition (see Appendix B), Fibrominn quantitatively compared arsenic levels present in its poultry litter fuel, as well as in poultry litter nationally, with arsenic levels present in traditional fuel materials. Results clearly demonstrated that arsenic levels present in Fibrominn's poultry litter, as well as in poultry litter generally, are less than or comparable to arsenic levels present in the traditional fuels, clean wood and coal. Arsenic levels present in poultry litter clearly do not constitute adulteration that transforms poultry litter into another type of waste.

E. Homogenous waste has sufficient heating value (HHV) to burn autogenously and to serve the purpose of energy recovery.

Since startup in 2007, the Fibrominn Plant has established a strong commercial operating record demonstrating that, with its stoker boiler system, it can combust poultry litter as the principal fuel autogenously (that is, without using supplemental fuel). Further, that operating record demonstrates the Fibrominn Plant recovers meaningful energy cost-effectively and with high reliability, resulting in profitable sale of the energy. As detailed in the Fibrominn non-waste petition (see Appendix B), Fibrominn has combusted 350,000 to 450,000 tons per year of poultry litter as the principal fuel in 2010, 2011, and 2012, to generate over 400,000 MWh annually of electric power that is sold on the grid. In its most recent full year of operation (2012), using poultry litter as the principal fuel, the Fibrominn Plant achieved a very favorable "capacity factor" of 92%.

Also as detailed in the Fibrominn non-waste petition, the higher heating value (HHV) for Fibrominn's poultry litter, as received, is typically within the range of 3,400 to 5,000 Btu/lb, based on extensive testing. Owing to its relatively high moisture content, the HHV value for poultry litter is less than for most traditional fuel materials. However, green wood chips are a common traditional fuel that also have a relatively low HHV (~ 4,500 Btu/lb), and for the same

reason; i.e., a relatively high moisture content. The higher moisture content of poultry litter and green wood chips reduces the HHV of those materials, compared with the same materials if dried. Even though poultry litter and green wood chips have significant moisture content, both fuels can burn autogenously in a properly designed stoker boiler to achieve meaningful heat recovery and profitable energy sales. This is specifically what is occurring commercially with use of poultry litter as the principal fuel at the Fibrominn Plant.

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Fibrominn appreciates the Agency's efforts in reviewing this Notification. Please do not hesitate to contact me with any questions or should you need further information to facilitate your review. My contact information is as follows:

- Matt Hall, Chief Information Officer, Fibrominn LLC
  matt.hall@contourglobal.com
  646-300-3638

Besides myself, please also copy the following individuals on any email or written correspondence:

- David Minott, Arc5 Environmental Consulting, LLC
  david.minott@arc5enviro.com
  978-877-7719
- Scott Knudson, Briggs and Morgan
  SKnudson@Briggs.com
  612-977-8279

Sincerely,

M. T. Hall

Matt Hall
Chief Information Officer
Fibrominn LLC

ATTACHMENTS:

Appendix A – FERC QF Certifications for the Fibrominn Biomass Power Plant

Appendix B – Fibrominn Biomass Power Plant – "Application for a Non-Waste Determination Under 40 CFR Part 241.3(c)" filed with EPA Region V on July 1, 2013

cc: List on next page

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Copies of this letter to:

U.S. EPA via email –

- Ms. Susan Hedman, Regional Administrator, U.S. EPA Region V (Hedman.Susan@epa.gov)
- Ms. Toni Wyche Jones, U.S. EPA Headquarters, CISWI Project Lead (Jones.Toni@epa.gov)

MPCA via email –

- Trevor Shearen (trevor.shearen@state.mn.us)
- Richard Cordes (richard.cordes@state.mn.us)
- Steve Gorg (steven.gorg@state.mn.us)

Also -

- Matt Hall, Fibrominn LLC (matt.hall@contourglobal.com)
- David Minott, Arc5 Environmental Consulting LLC (david.minott@arc5enviro.com)
- Scott Knudson, Briggs and Morgan (SKnudson@Briggs.com)

Fibrominn QF Exemption Notification

APPENDIX A

FERC QF Certifications for the Fibrominn Biomass Power Plant

Form Approved
OMB Control No. 1902-0075
Expires 11/30/2009

FERC Form No. 556
18 C.F.R. § 131.80

CERTIFICATION OF QUALIFYING FACILITY STATUS FOR AN EXISTING OR A PROPOSED SMALL POWER PRODUCTION OR COGENERATION FACILITY

INFORMATION ABOUT COMPLIANCE

Compliance with the information collection requirements established by the FERC Form No. 556 is required to obtain and maintain status as a qualifying facility. *See* 18 C.F.R. § 131.80 and Part 292. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

SUBMITTING COMMENTS ON PUBLIC REPORTING BURDEN

The estimated burden for completing FERC Form No. 556, including gathering and reporting information, is 4 hours for self-certifications and 38 hours for applications for Commission certification. Send comments regarding this burden estimate or any aspect of this collection of information, including suggestions for reducing this burden, to the following: Michael Miller, Office of the Executive Director (ED-34), Federal Energy Regulatory Commission, 888 First Street NE., Washington, DC 20426; and Desk Officer for FERC, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503 (oira_submission@omb.eop.gov). Include the Control No. 1902-0075 in any correspondence.

GENERAL INSTRUCTIONS

Complete this form by replacing bold text below with responses to each item, as required.

PART A: GENERAL INFORMATION TO BE SUBMITTED BY ALL APPLICANTS

1a. Full name of applicant: [Note: Applicant is the legal entity submitting this form, not the individual employee making the filing. Generally, the Applicant will be a company, corporation or organization, unless the facility is owned directly by an individual or individuals.]

Fibrominn LLC

Docket Number assigned to the immediately preceding submittal filed with the Commission in connection with the instant facility, if any:

Docket Number QF05-26-000

Purpose of instant filing (self-certification or self-recertification [18 C.F.R. § 292.207(a)(1)], or application for Commission certification or recertification [18 C.F.R. §§ 292.207(b) and (d)(2)]):

Self-recertification to reflect a change in upstream ownership

1b. Full address of applicant:

Fibrominn LLC
c/o Unagi LLC
650 Madison Avenue
New York, NY 10022

1c. Indicate the owner(s) of the facility (including the percentage of ownership held by any electric utility or electric utility holding company, or by any persons owned by either) and the operator of the facility.

PowerMinn 9090, LLC owns the 55 MW biomass-fired Fibrominn Biomass Power Plant located in Benson, Minnesota (the "Facility").

Fibrominn, LLC ("Fibrominn") leases and operates the Facility and all related equipment.

Fibrominn Holdings, LLC ("Fibrominn Holdings") is the sole member of and owner of 100% of the membership interests in Fibrominn. Unagi, LLC ("Unagi"), a Delaware limited liability company, owns 100% of the Membership Interests in Fibrominn Holdings. Unagi is 100% owned by Countour Global, L.P. ("Countour Global").

No entity that owns a direct or an indirect interest in the Facility is an "electric utility" or an "electric utility holding company" other than with respect to Qualifying Facilities ("QFs"), Exempt Wholesale Generators ("EWGs"), or foreign utility companies ("FUCOs").

Additionally, state whether or not any of the non-electric utility owners or their upstream owners are engaged in the generation or sale of electric power, or have any ownership or operating interest in any electric facilities other than qualifying facilities.

None of Fibrominn Holdings, Unagi or Countour Global is directly engaged in the generation or sale of electric power. None of Fibrominn, Fibrominn Holdings, Unagi or Contour Global has any ownership or operating interest in any electric facilities other than QFs, EWGs or FUCOs.

In order to facilitate review of the application, the applicant may also provide an ownership chart identifying the upstream ownership of the facility. Such chart should indicate ownership percentages where appropriate.

Please see ownership chart attached as Exhibit A hereto.

1d. Signature of authorized individual evidencing accuracy and authenticity of information provided by applicant: [Note: A signature on a filing shall constitute a certificate that (1) the signer has read the filing and knows its contents; (2) the contents are true as stated, to the best knowledge and belief of the signer; and (3) the signer possesses full power and authority to sign the filing. A person submitting a self-certification electronically via eFiling may use typed characters representing their name to show that the person has signed the document. *See* 18 C.F.R. § 385.2005.]

/s/ Joseph C. Brandt
Manager

2. Person to whom communications regarding the filed information may be addressed:

Name: **Joseph C. Brandt**

Title: **Manager**

Telephone number: **(212) 610-9140**

Mailing address: **650 Madison Avenue, New York, NY 10022**

3a. Location of facility to be certified:

State: **See prior certification**

County: **See prior certification**

City or town: **See prior certification**

Street address (if known): **See prior certification**

3b. Indicate the electric utilities that are contemplated to transact with the qualifying facility (if known) and describe the services those electric utilities are expected to provide:

See prior certification

Indicate utilities interconnecting with the facility and/or providing wheeling service [18 C.F.R. §§ 292.303(c) and (d)]:

See prior certification

Indicate utilities purchasing the useful electric power output [18 C.F.R. §§ 292.101(b)(2), 292.202(g) and 292.303(a)]:

See prior certification

Indicate utilities providing supplementary power, backup power, maintenance power, and/or interruptible power service [18 C.F.R. §§ 292.101(b)(3), (b)(8), 292.303(b) and 292.305(b)]:

See prior certification

4a. Describe the principal components of the facility including boilers, prime movers and electric generators, and explain their operation. Include transmission lines, transformers and switchyard equipment, if included as part of the facility.

See prior certification

4b. Indicate the maximum gross and maximum net electric power production capacity of the facility at the point(s) of delivery and show the derivation. [Note: Maximum gross output is the maximum amount of power that the facility is able to produce, measured at the terminals of the generator(s). Maximum net output is maximum gross output minus (1) any auxiliary load for devices that are necessary and integral to the power production process (fans, pumps, etc.), and (2) any losses incurred from the generator(s) to the point of delivery. If any electric power is consumed at the location of the QF (or thermal host) for purposes not related to the power production process, such power should not be subtracted from gross output for purposes of reporting maximum net output here.]

Gross output: **See prior certification**

Net output: **See prior certification**

Derivation (assumptions about losses, auxiliary load or lack thereof, and calculation of gross and net output):

See prior certification

4c. Indicate the actual or expected installation and operation dates of the facility, or the actual or expected date of completion of the reported modification to the facility:

See prior certification

4d. Describe the primary energy input (e.g., hydro, coal, oil [18 C.F.R. § 292.202(l)], natural gas [18 C.F.R. § 292.202(k)], solar, geothermal, wind, waste, biomass [18 C.F.R. § 292.202(a)], or other). For a waste energy input that does not fall within one of the categories on the Commission's list of previously approved wastes, demonstrate that such energy input has little or no current commercial value and that it exists in the absence of the qualifying facility industry [18 C.F.R § 292.202(b)].

See prior certification

5. Provide the average annual hourly energy input in terms of Btu for the following fossil fuel energy inputs, and provide the related percentage of the total average annual hourly energy input to the facility [18 C.F.R § 292.202(j)]. For any oil or natural gas fuel, use lower heating value [18 C.F.R § 292.202(m)]:

Natural gas: **See prior certification**

Oil: **See prior certification**

Coal (applicable only to a small power production facility): **See prior certification**

6. Discuss any particular characteristic of the facility which the cogenerator or small power producer believes might bear on its qualifying status.

See prior certification

PART B: DESCRIPTION OF THE SMALL POWER PRODUCTION FACILITY

Items 7 and 8 only need to be answered by applicants seeking certification as a small power production facility. Applicants for certification as a cogeneration facility may delete Items 7 and 8 from their application, or enter "N/A" at both items.

7. Describe how fossil fuel use will not exceed 25 percent of the total annual energy input limit [18 C.F.R §§ 292.202(j) and 292.204(b)]. Also, describe how the use of fossil fuel will be limited to the following purposes to conform to Federal Power Act section 3(17)(B): ignition, start-up, testing, flame stabilization, control use, and minimal amounts of fuel required to alleviate or prevent unanticipated equipment outages and emergencies directly affecting the public.

See prior certification

8. If the facility reported herein is not an eligible solar, wind, waste or geothermal facility, and if any other non-eligible facility located within one mile of the instant facility is owned by any of the entities (or their affiliates) reported in Part A at item 1c above and uses the same primary energy input, provide the following information about the other facility for the purpose of demonstrating that the total of the power production capacities of these facilities does not exceed 80 MW [18 C.F.R § 292.204(a)]: [*See* definition of an "eligible facility" below. Note that an "eligible facility" is a specific type of small power production facility that is eligible for special treatment under the Wind, Waste and Geothermal Power Production Incentives Act of 1990, as subsequently amended in 1991, and should not be confused with facilities that are generally eligible for QF status.]

Facility name, if any (as reported to the Commission):

See prior certification

Commission Docket Number:

See prior certification

Name of common owner:

See prior certification

Common primary energy source used as energy input:

See prior certification

Power production capacity (MW):

See prior certification

An eligible solar, wind, waste or geothermal facility, as defined in Section 3(17)(E) of the Federal Power Act, is a small power production facility that produces electric energy solely by the use, as a primary energy input, of solar, wind, waste or geothermal resources, for which either an application for Commission certification of qualifying status [18 C.F.R § 292.207(b)] or a notice of self-certification of qualifying status [18 C.F.R § 292.207(a)] was submitted to the Commission not later than December 31, 1994, and for which construction of such facility commences not later than December 31, 1999, or if not, reasonable diligence is exercised toward the completion of such facility, taking into account all factors relevant to construction of the facility.

PART C: DESCRIPTION OF THE COGENERATION FACILITY

Items 9 through 15 only need to be answered by applicants seeking certification as a cogeneration facility. Applicants for certification as a small power production facility may delete Items 9 through 15 from their application, or enter "N/A" at each item.

Items 9 through 15 deleted

CERTIFICATE OF SERVICE

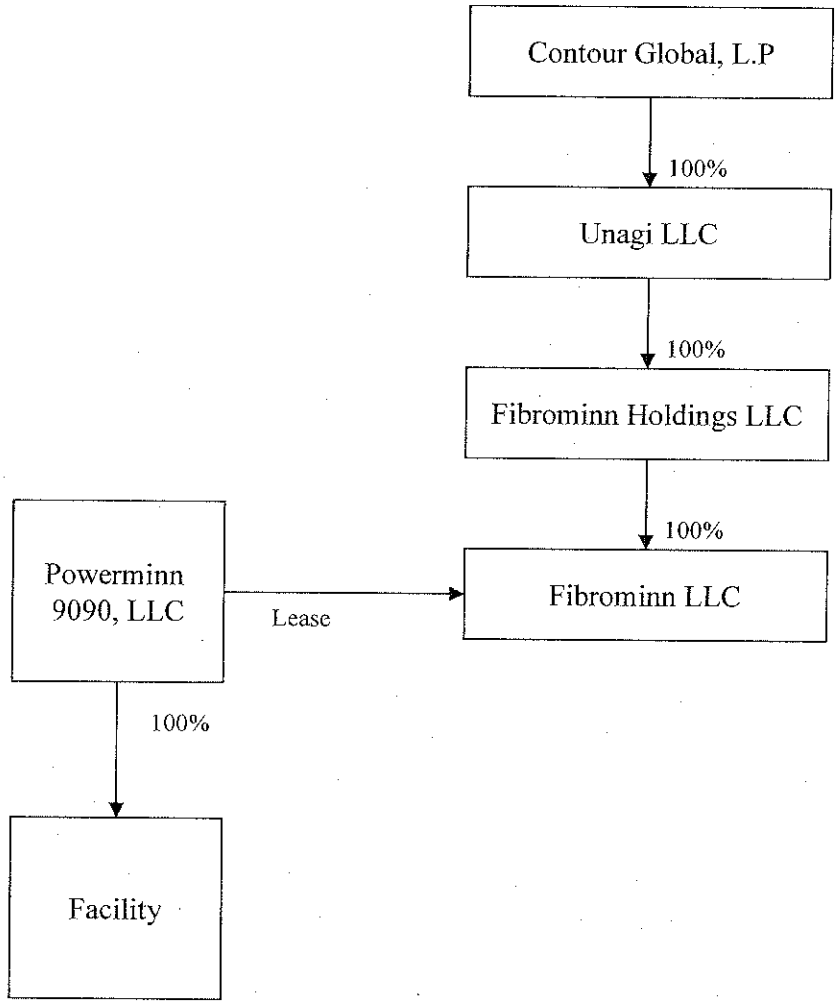
Pursuant to Sections 292.207(a)(ii) and 385.2010 of the Commission's regulations, I hereby certify that I have served a copy of the foregoing Notice of Self-Recertification, which contains a completed Form 556, upon the Northern States Power Company and the Minnesota Public Utilities Commission.

Dated at Washington, D.C., this 15th day of December, 2009.

Adam Wenner
Chadbourne & Parke LLP
1200 New Hampshire Ave., N.W.
Washington, D.C. 20036
(202) 974-5600

EXHIBIT A

Ownership and Lease of Facility



UNITED STATES OF AMERICA
Before the
FEDERAL ENERGY REGULATORY COMMISSION

Fibrominn LLC Docket No. QF05-____-000

NOTICE OF SELF-CERTIFICATION
AS A QUALIFYING SMALL POWER PRODUCTION FACILITY

Pursuant to 18 CFR §292.207(a)(1) of the Federal Energy Regulatory Commission ("FERC") regulations, Fibrominn LLC ("Applicant") hereby submits this Notice to self-certify its proposed biomass-fueled generating facility, the Fibrominn Biomass Power Plant ("Facility") to be located in Benson, Minnesota as a qualifying small power production facility under the Public Utility Regulatory Policies Act of 1978, as amended. The Facility has not been previously certified with the FERC and therefore no docket number has been previously assigned. FERC has separately found that the Facility will be an exempt wholesale generator ("EWG") and granted market-based rate authority. 1/

FORM 556

PART A GENERAL INFORMATION

1a. Applicant

The Applicant is Fibrominn LLC and the project for which certification is being sought is the proposed Fibrominn Biomass Power Plant in Benson, Minnesota.

1b. Applicant Address

The Applicant is a limited liability company organized under the laws of the State of Delaware with its principal office and place of business at 301 Oxford Valley Road, Makefield Executive Quarters, Suite 704A, Yardley, PA 19067.

1c. Identification of Ownership

The Facility will be 100% owned by PowerMinn 9090, LLC ("Owner") and will be leased to the Applicant prior to its commercial operation date. The Facility will be operated by the Applicant. The expected upstream ownership structure of the Applicant and the Owner (as of the closing date of the financing for the project) identifying any owners with a 10% or more ownership interest is attached hereto as Exhibit A and Exhibit B, respectively.2

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1 See Letter Orders issued October 22, 2004 in Docket No. EG04-103-000 and November 1, 2004 in Docket No. ER04-1245-000, respectively. See also Letter Order issued October 28, 2004 in Docket No. EG05-1-000, finding that the Facility's owner, PowerMinn 9090, LLC is an EWG.
2 Certain of the smaller upstream owners (all of whom operate outside of the United States) are not specifically identified in Exhibit A. However, the combined derivative ownership share of such entities in

None of the Applicant, the Owner of the Facility or any upstream owner of either the Applicant or the Owner, including individuals, is or holds an ownership interest of 5% or more in an electric utility or an electric utility holding company within the meaning of §292.206 and §292.202(n) of the FERC regulations, or is engaged in the generation or sale of electric energy within North America other than from Qualifying Facilities or EWG Facilities. The proposed Facility is not owned more than 50% by an electric utility, an electric utility holding company, or any combination thereof, within the meaning of §292.206 and §292.202(n) of the FERC regulations.

1d. Authorized Signature

The required signature of an authorized individual evidencing accuracy and authenticity of the information appearing herein appears at the end of this notice.

2. Primary Contacts

Carl W. Strickler, Vice President
and Chief Operating Officer
Fibrominn LLC
301 Oxford Valley Road
Makefield Executive Quarters, Suite 704A
Yardley, PA 19067
Tel: (215) 321-4866
Fax: (215) 321-3909

John R. Lilyestrom
Hogan & Hartson, LLP
Columbia Square
555 Thirteenth St., N.W.
Washington, D.C. 20004
Tel: (202) 637-5633
Fax: (202) 637-5910

3a. Facility Location

The Facility will be located entirely within the City of Benson, Minnesota. The City of Benson is located entirely within Swift County. The Facility, when constructed, will have an address of 900 Industry Drive, Benson, Minnesota, 56215.

3b. Utility Involvement

The Facility will be located in the service territory of Great River Energy ("GRE") and its entire output will be sold by the Applicant to Northern States Power Company ("NSP") pursuant to a twenty-one year power sales contract. The Facility will be interconnected with transmission facilities of GRE pursuant to an interconnection and operating agreement that the Applicant has entered into

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the Applicant is well below 50 percent and, in any event, as noted above, none of the upstream owners of the Applicant is engaged in the generation or sale of electric energy within North America other than from Qualifying Facilities or EWG Facilities.

with GRE. The Facility will receive Back-up Power and Maintenance Power from the City of Benson.

4a. Principal Facility Components

The Facility will be designed for a 50 MW (nominal) net electric power output and will consist of a single Foster Wheeler conventional solid fuel-fired "stoker" boiler that produces steam to drive a single steam turbine generator. The Facility will utilize a single conventional boiler design with a vibratory grate. The boiler will be equipped with a combustion chamber, a superheater, an evaporator, an economizer, air heaters, and steam coil air preheaters. The Facility's exhaust gas emissions will be controlled by an air pollution control system, which includes the use of good combustion practices, selective non-catalytic reduction ("SNCR") for NOx, a spray-dryer absorber for acid gas control, and a fabric filter baghouse for particulate control.

The steam turbine generator will generate electricity at 13.8 kV. The electricity will pass through an onsite step-up transformer, which will convert the voltage to 115 kV. The step-up transformer will be a part of the Facility. On the high voltage side of the step-up transformer, ownership changes to GRE. The electricity will then be carried through a new, dedicated overhead pole-mounted transmission line to the GRE Benson substation located approximately one-quarter mile north of the Facility. GRE will construct, own, operate, and maintain all facilities and attachments associated with the new 115 kV transmission line.

4b. Power Production Capacity

The maximum gross nameplate capacity of the Facility has not yet been finalized; however, such capacity will not exceed 80 MW and is currently estimated not to exceed 66 MW. Under normal operating conditions, the Facility will generate up to 50 MW of electricity for export; however, the Facility will be capable of producing up to 55 MW of electricity for export when ambient conditions and/or fuel quality is appropriate. The point of interconnection between the Facility-owned assets and the GRE-owned assets is at the high voltage side of the step-up transformer.

4c. Project Timeline

The Facility is not yet constructed, but the intent is for it to be constructed and operational by December 2006.

4d. Primary Energy Input

The Facility will utilize poultry litter as its primary energy input, in conjunction with other secondary vegetative biomass fuels. Poultry litter consists of a mixture of poultry droppings and bedding material - typically wood shavings or sunflower hulls. Based on the expected fuel mix, poultry litter (turkey and chicken litter) will comprise well over 75% of the biomass input on an annual basis. The remainder of the fuel will be secondary vegetative biomass, which could include materials such as alfalfa stems, oat hulls, distiller grains, corn stover, sugar beet residue, annual grasses, sunflower hulls, wood and other similar agricultural or biomass materials.

5. **Fossil Fuel Energy Input**

Propane and/or natural gas will be used as a supplemental fuel, to ensure maintenance of good combustion conditions during periods of Facility start-up and shutdown, for flame stabilization, during testing, and when needed to alleviate or prevent unanticipated equipment outages. Consistent with the Commission's requirements (18 C.F.R. § 292.204(b)), biomass will constitute no less than 75% of the Facility's fuel input on an annualized (calendar-year) basis. The Applicant is also restricted by its power agreement with NSP to comply with the fuel use requirements of the Minnesota Biomass Mandate (described below in Section 7).

6. **Other Characteristics**

None

PART B SMALL POWER PRODUCTION FACILITY DESCRIPTION

7. **Fossil Fuel Use Limitation**

In 1994, the Minnesota Legislature enacted the Biomass Mandate, which required NSP to supply 125 MW of its electricity from sources using biomass technology. To help NSP fulfill the Biomass Mandate, the 1994 legislation was subsequently amended in 2000 to specifically state that poultry litter is an approved biomass fuel. Based on the provisions of the Biomass Mandate, the Applicant was able to enter into a long-term power purchase agreement with NSP in August 2000, and the Minnesota Public Utilities Commission subsequently approved this agreement in an order issued on May 8, 2001. Under the Biomass Mandate, the Applicant is restricted to a maximum fossil fuel usage of no greater than 25% of the Facility's energy input requirements.

In addition, the amount of fossil fuel the Applicant can use is limited by the Facility federal and state Air Permit to less than 20% fossil fuel heat input on a 3-year average. To demonstrate compliance with this air permit condition, the Applicant is obligated to keep separate records on the daily usage of biomass and

the daily usage of fossil fuels (propane and/or natural gas). Such fuel use records will be used to demonstrate that fossil fuels were utilized for up to but no more than 25% of Facility's annual energy input requirements within the meaning of § 292.204(b) of the FERC regulations.

As explained above, fossil fuel will be utilized solely for the uses expressly permitted in Section 3(17)(B) of the Federal Power Act.

8. **Adjacent Facilities**

The Facility is not an "eligible facility" as defined in §3(17)(E) of the Federal Power Act. There is no other facility located within one mile of the Facility that is owned by the Applicant or any affiliate or upstream owner of the Applicant.

PART C COGENERATION FACILITY DESCRIPTION

Part C is not applicable, as the Facility will be a small power producer.

Respectfully submitted,
On behalf of Fibrominn LLC

Carl W. Strickler, Vice President
and Chief Operating Officer
Fibrominn LLC
301 Oxford Valley Road
Makefield Executive Quarters, Suite 704A
Yardley, PA 19067

EXHIBIT A
Ownership Structure of the Applicant

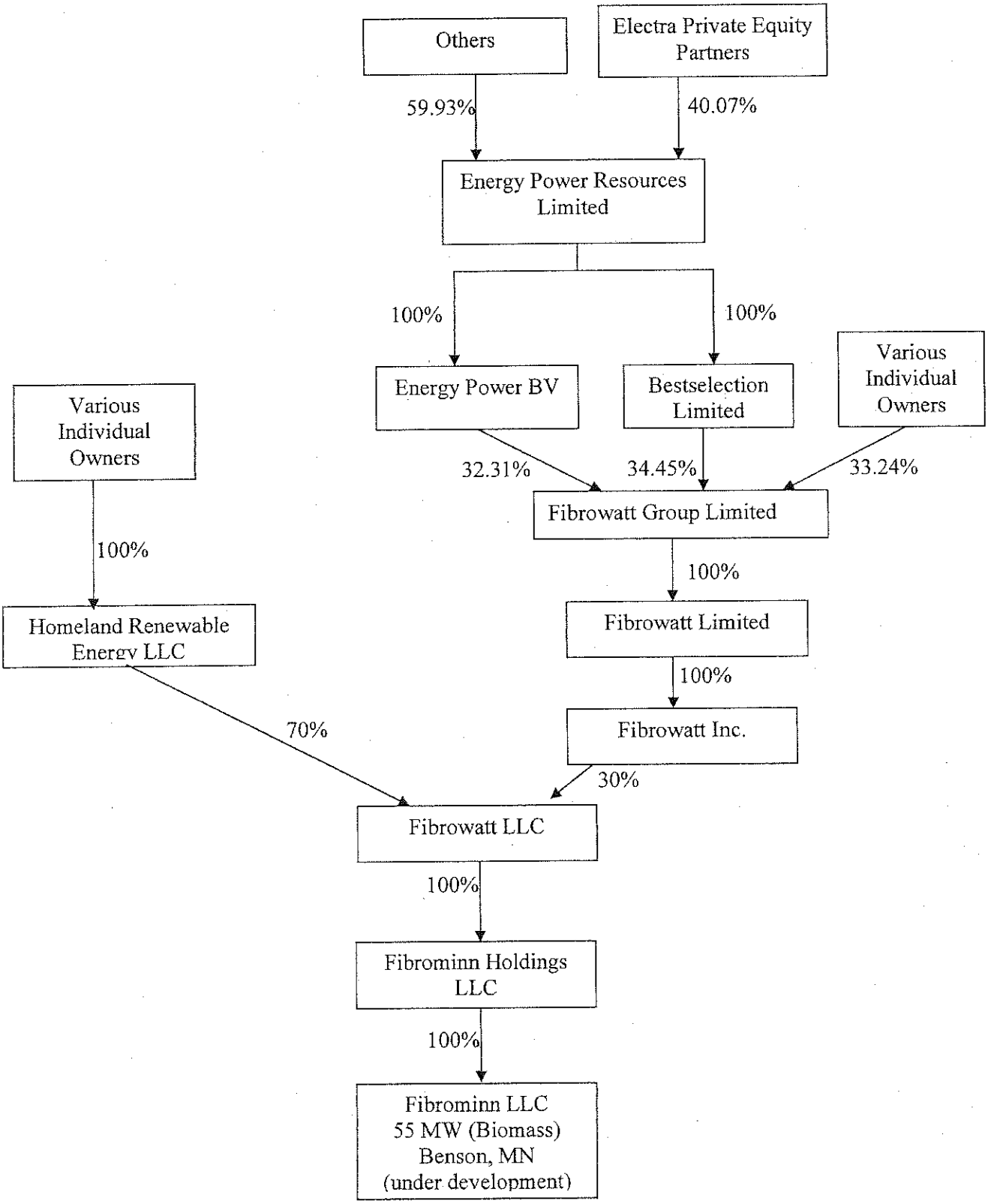
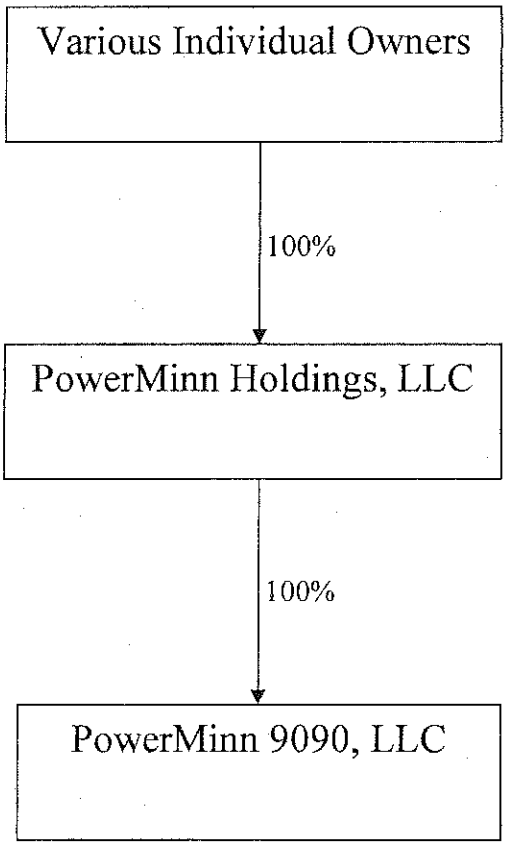

Others
Electra Private Equity Partners
59.93%
40.07%
Energy Power Resources Limited
100%
100%
Energy Power BV
Bestselection Limited
Various Individual Owners
Various Individual Owners
32.31%
34.45%
33.24%
Fibrowatt Group Limited
100%
Homeland Renewable Energy LLC
Fibrowatt Limited
100%
70%
Fibrowatt Inc.
30%
Fibrowatt LLC
100%
Fibrominn Holdings LLC
100%
Fibrominn LLC
55 MW (Biomass)
Benson, MN
(under development)

EXHIBIT B
Ownership Structure of the Owner


Various Individual Owners
100%
PowerMinn Holdings, LLC
100%
PowerMinn 9090, LLC

Fibrominn QF Exemption Notification

APPENDIX B

Fibrominn Biomass Power Plant – "Application for a Non-Waste Determination Under 40 CFR Part 241.3(c)" filed with EPA Region V on July 1, 2013

FibroMinn
a CONTOURGLOBAL company

Fibrominn Power Plant
900 Industry Drive
PO Box 265
Benson, MN 56215
Tel: (320) 843-9013
Fax: (320) 843-9014

July 1, 2013

Ms. Susan Hedman,
Regional Administrator
US EPA Region V
77 West Jackson Blvd
R19J
Chicago, IL 60604-3590

Submitted Electronically to Ms. Hedman through Mr. Bharat Mathur, Deputy Regional Administrator at mathur.bharat@epa.gov

Subject: Fibrominn Biomass Power Plant, Benson, MN – Poultry Litter Fuel
(MPCA Air Permit No. 15100038)
Application for Non-Waste Determination Under 40 CFR Part 241.3(c)

Dear Ms. Hedman:

Fibrominn LLC owns and operates the 55-MW Fibrominn Biomass Power Plant ("Fibrominn Plant") in Benson, Minnesota, which has been in continuous operation since 2007. The Fibrominn Plant is fueled principally with poultry litter obtained from poultry producers who grow turkeys and chickens in Minnesota. Poultry litter is a material comprised of only two components: poultry droppings and poultry bedding material, typically, wood shavings. While the Fibrominn Plant combusts poultry litter as its principal fuel, it also co-combusts vegetative biomass (typically, wood chips) as a secondary biomass fuel. Historically, the majority fraction of the fuel mix has been poultry litter, a 50% to 75% fraction.

Under 40 CFR Part 241, U.S. EPA presently considers animal manure categorically to be a secondary non-hazardous material that is a solid waste material when combusted. This includes poultry manure. Pursuant to 40 CFR Part 241.3(c), Fibrominn LLC submits this letter to U.S. EPA as an application for a non-waste determination for the poultry litter (chicken litter and turkey litter) that Fibrominn burns as a fuel.

As documented below, Fibrominn can demonstrate that its poultry litter fuel meets all requirements for a non-waste determination, including, specifically, that the poultry litter has not been discarded, see 40 CFR § 241.3(c), and that it meets the fuel legitimacy criteria at 40 CFR § 241.3(d,) as well as the related criteria at 40 CFR § 241.3(c)(1).

1.0 REGULATORY BACKGROUND

Pursuant to Section 1004 of the Resource Conservation and Recovery Act (RCRA) and Section 129 of the Clean Air Act, U.S. EPA (EPA) sets out at 40 CFR Part 241 procedures for identifying non-hazardous secondary materials (NHSM) that are waste materials when used as fuels in a combustion unit. This Part 241 rule is commonly referred to as the Non-Hazardous Secondary Materials Rule (NHSM Rule). The combustion of any NHSM that is a solid waste material is regulated under Section 129 of the Clean Air Act, for example, under the Commercial-Industrial Solid Waste Incinerator (CISWI) Rule. Under the NHSM Rule, EPA presumptively considers all manures to be secondary materials that are a waste material when combusted. Because Fibrominn burns poultry litter as fuel, and poultry litter contains manure, the Fibrominn plant is presumptively subject to regulation under the CISIWI Rule. However, Fibrominn can apply to EPA for a case-specific non-waste determination under 40 CFR § 241.3(c) for its poultry litter fuel material, based on a demonstration that the material has not been discarded and does meet stated criteria at 40 CFR § 241.3(c)(1), as well as the fuel legitimacy criteria at 40 CFR § 241.3(d).

For such petitions, EPA states at 40 CFR § 241.3(c)(1) the factors it considers in weighing whether to grant a non-waste determination for a given NHSM:

- Whether market participants treat the NHSM as a fuel rather than as a waste;
- Whether the chemical and physical identity of the NHSM is comparable to commercial fuel;
- Whether the capacity of the market would use the NHSM within a reasonable timeframe;
- Whether the constituents in the NHSM are released to the air, water, or land from the point of generation to just prior to the point of combustion, at levels comparable to what would otherwise be released from traditional fuels; and
- Other relevant factors.

Specifically in these regards, EPA has developed fuel legitimacy criteria that a NHSM must meet to enable a non-waste determination. Listed at 40 CFR § 241.3(d(1)) are the three fuel legitimacy criteria:

1. The NHSM must be managed as a valuable commodity.
2. The NHSM must have a meaningful heating value and be burned in units that recover energy.

3. The NHSM must contain contaminants that are comparable to or lower than in traditional fuel products.

In the sections that follow, Fibrominn demonstrates that it meets, in turn, each requirement for EPA to grant a non-waste determination for Fibrominn's poultry litter fuel. The applicable non-waste criteria at 40 CFR § 241.3(c)(1) overlap very closely with the specific fuel legitimacy criteria at 40 CFR § 241.3(d). Accordingly, rather than addressing compliance with the two sets of criteria separately (and redundantly), Fibrominn has ensured that in addressing compliance with the fuel legitimacy criteria, 40 CFR § 241.3(d), below, it has also explicitly addressed the criteria at 40 CFR § 241.3(c)(1).

2.0 MANAGED AS A VALUABLE COMMODITY - 40 CFR § 241.3(d)(1)(i).

One of the fuel legitimacy criteria that must be met is that the NHSM be managed as a valuable commodity, based on the following factors :

- Storage prior to use must not exceed reasonable time frames.
- If there is an analogous fuel material, the NHSM must be managed in a manner consistent with the analogous fuel or otherwise be adequately contained to prevent releases to the environment.
- If there is no analogous fuel, the NHSM must be adequately contained so as to prevent releases to the environment.

The management by Fibrominn of poultry litter as a valuable commodity is documented below.

Managed as a Valuable Commodity, in a Manner Consistent with Analogous Traditional Fuels

Poultry litter fuel is procured via contract. As a baseload power generation facility, Fibrominn is reliant upon a consistent supply of poultry litter fuel, sourced principally from poultry growers in Minnesota. To ensure a consistent fuel supply, Fibrominn procures poultry litter fuel through both long-term contracts and short-term "spot" purchases, as is done with traditional biomass fuels such as wood chips. Long-term contracts are 10 years in duration. Approximately 75% of Fibrominn's poultry-litter fuel supply is under long-term contracts, with 25% procured through spot purchases. The fuel supply contracts are directly between Fibrominn and the poultry producer generating the poultry litter fuel. Both the long-term and spot purchase contracts contain a fuel specification that is clearly intended to ensure that the litter has adequate fuel quality and is low in contaminants. The contract specifies: wood shavings as the only permissible bedding material without prior approval from Fibrominn for substitution, maximum moisture and ash contents, no plastics or metal present, no water added, and poultry rearing in accordance with good animal husbandry practices.

Poultry litter has a purchase price. Fibrominn has always paid a price for the poultry litter it procures for use as a fuel. The specific pricing information is proprietary. That Fibrominn always pays for its poultry litter fuel, and via both long-term contracts and spot-market procurements, is directly analogous to how traditional biomass fuel (wood chips) is procured.

Physical management of the poultry litter as a valuable fuel product. Poultry litter fuel handling begins with removal of the litter from the poultry grower's barn, following the completion of a poultry growing cycle. The litter is removed by the grower, or by a Fibrominn contractor, using a front-end loader or loader conveyor system. The litter removed from the barn is loaded directly into trucks, and under normal conditions, is transported the same day to Fibrominn. Fibrominn contracts with the trucking companies to transport the litter from grower to Fibrominn. Ownership of the litter transfers from the grower to Fibrominn when the litter is loaded into the truck at the poultry farm. The trucks transporting the litter to Fibrominn are always covered. When trucks delivering poultry litter to Fibrominn enter the plant, the delivered fuel is weighed on a truck scale, then the truck drives into the fully-enclosed fuel hall of the power plant, where the poultry litter is off-loaded and stored prior to combustion. The fact that the poultry litter is transported in covered trucks and off-loaded and stored in the enclosed fuel hall preserves fuel quality by prohibiting weather-related moisture uptake. Before trucks dump the poultry litter into the fuel storage pits within the enclosed fuel hall, fuel samples are obtained for subsequent analysis to verify that the litter meets contractual fuel specifications. Handling of poultry litter so as to preserve fuel quality and regular sampling to verify fuel quality are clear indications that the poultry litter is being managed as a valuable fuel product.

Storage prior to use must not exceed a reasonable time frame.

Storage of the poultry litter fuel used by Fibrominn does not exceed reasonable time frames. As noted above, under normal operations, the litter is transported same-day from the poultry grower's barn to Fibrominn, with no intermediate staging or storage. The delivered litter is off-loaded and stored within Fibrominn's totally enclosed fuel hall. During normal operations, the litter is burned as a fuel within three days of its delivery to Fibrominn, which is notably shorter than with almost all traditional solid and liquid fuels.

During Fibrominn plant outages, which are infrequent, the poultry litter removed from the grower's barn may have a staged delivery to Fibrominn. That is, the litter removed from a poultry grower's barn is temporarily stored at the transporter's facility, either within a shed or on a pad outdoors, then re-loaded and delivered to Fibrominn as soon as the plant comes back on line. The duration of such staging is restricted to a maximum of one to two months, specifically to ensure that the quality of the poultry litter fuel does not significantly degrade and in order to minimize the potential for runoff-related environmental impacts that could occur

with longer-term storage. The potential for fuel-quality degradation similarly limits the normal duration of outside storage for some common, traditional fuels such as wood chips. In addition, with the common practice of outside storage of traditional fuels such as coal and wood chips, there is also the potential for environmental impacts resulting from storm water runoff.

Importantly, Fibrominn does not accept any poultry litter that had been abandoned by the poultry grower, transporters, or others to long-term outdoor storage piles. Such long-term outdoor stockpiling of poultry litter would constitute discarding, in a manner analogous to used tires that have been abandoned long term in "legacy piles," rather than having been managed in an established tire collection program.

The Material Must Be Adequately Contained so as to Prevent Releases to the Environment.

As previously stated, the poultry litter is always transported to Fibrominn in fully-covered trucks and upon delivery to Fibrominn, is received, off-loaded, and stored in the fully-enclosed fuel hall prior to combustion. These measures are specifically intended to prevent contact between litter and the environment, hence, reducing the potential for impacts to the air, water (from storm water runoff), or land (from spillage). With this practice there is less potential for environmental contamination associated with storm water runoff with Fibrominn's handling and storage of poultry litter fuel indoors, than would exist with standard outdoor storage of traditional biomass fuels like wood chips. While not likely related to "contaminants" as defined by the NHSM Rule, the potential for litter-related odor impacts is effectively reduced by Fibrominn's use of covered trucks, as well as by having a totally-enclosed fuel receiving/storage hall that is maintained under negative air pressure, as part of the original plant design.

3.0 MEANINGFUL HEATING VALUE AND ENERGY RECOVERY – 40 CFR 241.3(d)(1)(ii).

Another fuel legitimacy criterion required to be met is that the NHSM must have a meaningful heating value and be used as a fuel in a combustion unit that recovers energy. In the preamble to the amendments EPA made to the Final NHSM Rule on February 7, 2013, see 78 FR 26, p.9172, EPA reiterated its use of a heating value benchmark of 5,000 Btu/lb *as fired* (which includes moisture), to define a presumptively meaningful heating value. There, EPA specifically stated that to meet ". . . the meaningful heating value legitimacy criterion, the material would need to meet an "as fired" heating value of 5,000 Btu/lb, or if lower than 5,000 Btu/lb, as fired, a person would need to demonstrate that the [energy recovery unit] can cost-effectively recover meaningful energy from the NHSM used as a fuel." A material's heating value inclusive of moisture, as fired, is normally referred to as the material's Higher Heating Value (HHV).

Factors that can be considered in demonstrating cost-effective and meaningful energy recovery were outlined by EPA in the rulemaking it promulgated on March 11, 2011, see 76 FR p.15,523:

- Whether the facility can realize a cost savings by not having to purchase significant amounts of traditional fuels they would otherwise need to use
- Whether they are purchasing the NHSM to use as a fuel
- Whether the NHSM the facility is using as a fuel can burn autogenously
- Whether the energy produced is sold for a profit

The poultry litter that Fibrominn uses as a principal fuel has an "as fired" heating value (measured as the HHV) that is less than the EPA benchmark of 5,000 Btu/lb. However, Fibrominn has a strong commercial operating record demonstrating that, with its stoker boiler system, it can combust poultry litter as the principal fuel autogenously (i.e., without using supplemental fuel), in turn, recovering meaningful energy cost-effectively and with high reliability, thus resulting in profitable sale of the energy. Poultry litter fuel is analogous to traditional, green wood chips as a fuel in this regard. Both poultry litter and green wood chips, as fired, have high moisture content. The higher moisture content of poultry litter and green wood chips reduces the heating value of the material, compared with the same materials if dried. Even though green wood chips and poultry litter have significant moisture content, one can achieve meaningful heat recovery and profitable energy sales using either fuel material, despite both fuel materials having heating values that are below the 5,000 Btu/lb benchmark.

The bases for establishing that Fibrominn's poultry litter fuel has a meaningful heating value and is combusted to achieve cost-effective, meaningful energy recovery are documented in further detail below.

Poultry litter is more cost-effective.

As discussed above under "managed as a valuable commodity," Fibrominn procures its principal fuel, poultry litter, under contract from the poultry producers who generate it. About 75% of Fibrominn's poultry litter fuel supply is procured under long-term contracts. Currently, the typical long-term contract price for the poultry litter fuel (which is proprietary) is significantly less than for green wood chips, the presumptive replacement traditional fuel. Hence, poultry litter is a more cost-effective fuel for this particular biomass power plant location than are wood chips.

Poultry litter is purchased as a fuel material.

As discussed above, Fibrominn procures all its principal fuel, poultry litter, under contract, and all the litter supply contracts include a fuel specification. Deliveries of poultry litter fuel to Fibrominn are regularly sampled and tested for conformance with the fuel specification.

Hence, the poultry litter is procured under contract specifically as fuel material and the material is regularly tested to ensure adequate fuel quality.

Poultry litter burns autogenously. / Energy produced is sold for a profit.

The Fibrominn Biomass Power Plant is the only large, grid-connected power plant in the U.S. that is specifically designed to use poultry litter as the principal fuel. The Fibrominn facility uses a standard spreader-stoker grate boiler system, with design enhancements to enable efficient firing of poultry litter as the principal fuel. The Fibrominn facility was both designed and permitted to fire up to 100% poultry litter autogenously (self-supported combustion, without supplemental fuels). Propane is used as a fuel at Fibrominn, but only during boiler startup and shutdown, as is normal practice with similar boiler systems fueled with traditional biomass fuels such as wood chips. Spreader-stoker boiler systems in general, including Fibrominn's, are also capable of energy recovery using a wide variety of traditional solid fuels and also other solid fuel materials that are classified as NHSMs. While the Fibrominn facility is designed to burn up to 100% poultry litter, the intent in practice was to use poultry litter as the principal fuel, and use vegetative biomass as the secondary fuel. When the Fibrominn facility was being designed, a number of different vegetative biomass materials were specifically evaluated for design purposes to serve as the secondary fuel materials, including wood chips, corn stover, oat hulls, alfalfa stems, distillers dried grain (DDG), and switchgrass.

Historically since startup in 2007, Fibrominn has successfully fired poultry litter as the principal fuel, co-fired with green wood chips as the normal secondary biomass fuel. Again, propane supplemental fueling does not take place, except for boiler startup and shutdown. Typically, the poultry litter fraction versus wood chips exceeds 50%, has often exceeded 60% historically, and has been as high as 75% poultry litter. The specific fuel mix of poultry litter and secondary vegetative biomass at any given time is determined by market factors, for example, the current availability and prices of poultry litter versus wood chips. The heating value for Fibrominn's poultry litter, as received, is typically within the range of 3,400 to 5,000 Btu/lb, based on extensive testing. While the heating value for poultry litter, as received, is less than EPA's presumptive benchmark of 5,000 Btu/lb for meaningful heat recovery, poultry litter burns autogenously in stoker boilers, and particularly at Fibrominn, when comprising the *majority* fraction of the fuel mix of litter and wood chips. Green wood chips, a traditional fuel, similarly has an HHV value that is less than the benchmark of 5,000 Btu/lb. EPA indicates a typical heating value for wood chips, as received at 50% moisture, to be 4,500 Btu/lb, see US EPA, AP-42, Section 1.6.1. While wood chips don't meet the heating value benchmark, they are the dominant type of biomass fuel utilized today for energy recovery. Despite not meeting the 5,000 Btu/lb benchmark, wood chips are well-recognized to burn autogenously in stoker boilers with meaningful energy recovery. Poultry litter similarly has a heating value less than 5,000 Btu/lb, but burns autogenously in stoker boilers with meaningful heat recovery.

The Fibrominn plant sells the electric energy it produces to the electric utility company, Xcel Energy. The commercial performance of the Fibrominn plant for the most recent three years of operation (2010, 2011, 2012) is illustrated in the table below, indicating the tonnage of poultry litter combusted, the amount of power sold, and the high capacity factors achieved by the plant. Clearly, the performance data demonstrate that when using poultry litter as the principal fuel (~ 350,000 to 450,000 tons per year), the Fibrominn plant recovers meaningful energy, and that energy is recovered cost-effectively and with high reliability, enabling profitable sale of the energy.

Fibrominn – Net Power Generation with Poultry Litter as the Principal Fuel				
Year	**Poultry Litter Burned (TPY)**	**Net MWh Sold**	**Capacity Factor (%)**	**Availability Factor (%)**
2012	344,900	442,522	91.6	92.1
2011	412,700	430,080	89.3	92.3
2010	451,200	409,573	85.0	88.1

Finally, while the Fibrominn Plant is the only large grid-connected power plant in the U.S. fueled principally with poultry litter, there are at least six other power plants in Europe that have successfully generated power for sale using poultry litter as the predominant fuel (see table below). This further illustrates that poultry litter fuel combustion can yield meaningful energy recovery, enabling commercially-viable energy sales.

Poultry Litter Power Plants in Europe		
Plant Location	**Capacity (MW)**	**Date Commissioned**
Eye Power Station (Suffolk, U.K.)	12.7	1992
Glanford Power Station (Lincolnshire, U.K.)	13.5	1993
Thetford Power Station (Norfolk, U.K.)	38.5	1998
Fife (Scotland)	9.8	2001
Moerdijk (Netherlands)	36.6	2008

4.0 COMPARABLE CONTAMINANTS LEVELS – 40 CFR § 241.3(d)(1)(iii).

US EPA Regulatory Background

The third legitimacy criterion for NHSM used as a fuel requires comparable contaminants levels. That is, the NHSM Rule requires that "*the secondary non-hazardous material must contain contaminants or groups of contaminants at levels comparable in concentration to or lower than those in traditional fuel(s) a unit is designed to burn.*" 40 CFR § 241.3(d)(1)(iii) In revising the NHSM Rule since 2011, EPA has clarified the contaminants that must be considered when making contaminant comparisons between secondary materials and materials that EPA deems to be traditional fuels. EPA has also further evolved associated guidance regarding the bases on which contaminant comparisons are appropriately made. Such regulatory information is summarized below, as is relevant to the current contamination comparisons for the poultry litter material that Fibrominn uses as a fuel.

Definition of Contaminant. The NHSM Rule, as amended by EPA in February 2013, defines *contaminants* as all pollutants listed in Clean Air Act sections 112(b) or 129(a)(4), with certain modifications. One relevant modification pertains to the elements chlorine (Cl), fluorine (F), nitrogen (N), and sulfur (S). Those elements are included in the definition of contaminants for making contaminant comparisons when they are precursors to the formation of the Section 112(b) or 129(a)(4) pollutants, HCl, HF, NOx, or SO_2. The latter pollutants, however, are NOT contaminants themselves for purposes of contaminant comparisons.

Groups of Contaminants. The amended NHSM Rule revises the legitimacy criteria for secondary materials used as a fuel to allow contaminants to be compared on either a contaminant-by-contaminant basis or, where reasonable, on the basis of groups of contaminants. The amended NHSM Rule and its preamble language addressed grouping of contaminants as follows, 40 CFR § 241.3(d) and 71 FR , p.9146:

- The Rule indicated that contaminants could be grouped based on shared physical and chemical properties as relate to combustion, including (but not limited to) volatility, the presence of specific elements, and compound structure.
- One approach to grouping contaminants was given by EPA as: TOX, nitrogenated HAP, VOCs, SVOCs, dioxins/furans, PCBs, and radionuclides.
- EPA also noted, as another example, that the halogens, Cl and F, can be grouped as total halogens.
- EPA noted clearly that "total metals" is not an appropriate grouping, because of the disparity in volatility of various metals in the combustion environment, especially for

mercury (Hg) which is highly volatile. EPA noted that metals can be appropriately grouped as volatile, semi-volatile and low-volatile categories.

Contaminants in Manures. In the final NHSM Rule issued in March 2011, EPA indicated specific concern for N and Cl levels in manures as regards demonstrating comparable contaminant levels. EPA stated that "levels of certain pollutants, such as nitrogen and chlorine, in certain types of manure, as generated, may not be comparable to those levels found in traditional fuels that otherwise would be burned. This is based on limited data . . . ." [FR V76, N54, P.15480 March 21, 2011]

Contaminant Comparative Statistics. The NHSM Rule, as amended by EPA in February 2013, further addresses the appropriate bases for comparison of contaminant levels in a secondary material with levels in a traditional fuel. To account for natural variability in contaminant levels, the comparisons can be based on the full range of contaminant levels in traditional fuels, provided such comparisons also consider the variability in the secondary material contaminant levels. Preamble language to the amendments further indicates that one should not compare the mean contaminant level of the secondary material with the upper end of the range of contaminant levels for the traditional material. Rather, the comparisons should be based on similar statistical data analyses, for example, comparison of means and standard deviations, or comparisons of the statistical upper ends of the ranges.

Contaminant Information Sources. The NHSM Rule, as amended by US EPA in February 2013, further addresses the appropriate data sources for information on materials contamination levels, when making contaminant comparisons between secondary materials and traditional materials. Contaminant testing by the petitioner is a legitimate data source; however, such testing is not a requirement for making contaminant comparisons. Contaminant data may also be obtained from the literature and other sources nationally. Expert knowledge of the specific industry and secondary materials is also an acceptable basis for determining if contaminant levels in a secondary material do or don't exceed levels in traditional fuels.

Poultry Litter Composition as Relates to Contaminant Comparisons

Poultry litter is physically comprised of a mixture of only two components: poultry manure and poultry bedding material, each of which is demonstrably a homogeneous biomass material. The homogeneity of the poultry-manure and bedding-material components of the litter contrasts with the heterogeneous composition of some other secondary materials used as a fuel, such as municipal solid waste (MSW) and unsorted construction and demolition waste (C&D waste).

The poultry litter combusted as a fuel at the Fibrominn plant includes both turkey litter and "broiler chicken" litter. Broiler chickens are chickens raised for meat production. Turkeys and

broiler chickens are raised on the floors of poultry barns. The barn floor is covered with poultry "bedding material," *e.g.*, wood shavings. Poultry litter is the term used to describe the accumulated mixture of bedding material and excreted poultry manure that is cleared from the barn between bird growing cycles. Over the bird-growing cycle, typically several months, the poultry litter loses moisture content as a result of both natural convection and forced ventilation of the barn.

The manure and bedding material components of poultry litter are each further addressed below, as regards their compositions and expected levels of contaminants.

Manure Component of Poultry Litter. Poultry manure is essentially grain that has been biologically processed via digestion. Poultry feed is grain-based. The poultry litter used by Fibrominn as a fuel comes from regional poultry growers whose poultry feed typically has the following constituents, in descending order of composition fraction:

- Grains (corn, soybean)
- Processed grain (soybean meal, distillers grain, bakery meal)
- Dietary grit (bonemeal, ground shells)
- Dietary calcium and phosphorous nutrients
- Salt

The grain-based constituents of the poultry feed are all classified as clean cellulosic biomass materials, as defined in the NHSM Rule and hence, are inherently low-contaminant materials. Nothing about the digestion by poultry of those clean cellulosic materials imparts hazardous contaminants or other regulated contaminants in significant quantity to the excreted manure material, with the exception of two contaminants to be further discussed subsequently (nitrogen and sulfur). The salt content of the poultry feed can impart a significant chlorine content to the manure. The dietary grit and nutrients in the feed do not impart contaminants to the manure in significant quantities. Besides poultry feed, poultry drinking water has the potential to contribute small concentrations of chlorine to the manure, owing to water disinfection with chlorine compounds. Some poultry growers add an arsenic-based anti-parasitic compound to drinking water or poultry feed in small quantities and this can impart trace levels of arsenic to the manure. Fibrominn concluded that the *manure component* of the poultry litter has the *potential* to impart significant quantities of four contaminants: N, Cl, S, and arsenic (As).

Bedding Material Component of Poultry Litter. Bedding material used in poultry barns is intended to mimic bedding conditions that birds establish in nature. For this reason, the bedding material is a form of clean cellulosic biomass. The poultry litter burned by Fibrominn as a fuel comes from regional poultry growers who use wood shavings and sunflower hulls as the bedding materials, although materials such as sawdust and peanut shells are used in other

parts of the country. The bedding-material component of the litter that Fibrominn uses as a fuel is comprised entirely of materials that EPA has determined to be clean cellulosic biomass materials. Accordingly, the bedding-materials component of poultry litter does not impart contaminants to the poultry litter that differ in type or level from the contaminant types and low levels that are inherently characteristic of clean cellulosic biomass.

Identification of Contaminants in Fibrominn's Poultry Litter that Warrant Numeric Versus Qualitative Contaminant Comparisons

For Fibrominn's poultry litter, the contaminants that warrant numeric contaminant comparisons versus those for which qualitative comparisons are appropriate and sufficient have been identified based on:

- Review of the available laboratory analytical data on poultry litter contaminant levels, including laboratory analyses commissioned by Fibrominn, as well as such data from the literature.

- Fibrominn's extensive and unique experience in operating a 55MW biomass power plant fueled principally with poultry litter, including Fibrominn's knowledge of poultry growing practices, poultry litter management practices, and poultry litter characteristics gained from Fibrominn's direct interface with poultry growers while in the course of contracting poultry litter fuel supplies.

Below, the contaminants present in Fibrominn's poultry litter are identified that are present at levels sufficient to warrant numerical contaminant comparisons with levels present in traditional fuels. Following that, the contaminants are identified for which qualitative contaminant comparisons based on expert knowledge are sufficient to reasonably establish that the contaminant is not present in Fibrominn's poultry litter at a level higher than found in traditional fuels.

Contaminants Warranting Numeric Contaminant Comparisons

Fibrominn has identified four contaminants for which its poultry litter fuel has the *potential* to have contaminant levels that exceed levels in traditional fuels: nitrogen (N), chlorine (Cl), sulfur (S), and arsenic (As). Hence, explicit, numeric contamination comparisons have been performed for each of those four contaminants. Further discussion of those four contaminants follows.

Nitrogen (N) – Animal manures are highly organic materials that characteristically have a high nitrogen content. As EPA has noted, animal manures can have elevated levels of nitrogen, relative to traditional fuels. This is relevant because a high fuel nitrogen content implies the potential for higher NOx emissions when the fuel is combusted.

Chlorine (Cl) – As EPA has noted, animal manures can have elevated levels of Cl, relative to traditional fuels. Poultry litter has the potential to have higher Cl levels than many traditional fuels, because chlorine compounds are present in the poultry diet (*e.g.*, salt, chlorinated drinking water). Furthermore, the Cl level in poultry litter can vary, depending on variations in poultry diet. The Cl level in poultry litter is relevant because higher fuel Cl content implies the potential for higher HCl emissions when the fuel is combusted.

Sulfur (S) - Poultry litter has the potential to have higher sulfur levels than some traditional fuels, because sulfur compounds are present in constituents of the poultry diet. This is relevant because higher fuel sulfur content implies the potential for higher SO_2 emissions when the fuel is combusted.

Arsenic Compounds (As) – Some poultry growers add a small amount of an arsenic compound to poultry drinking water or poultry feed to prevent parasitic infections in the birds. The trend in the poultry industry, however, is towards reduced use of arsenic compounds and the State of Maryland is the first to be pursuing an outright ban. That said, because such arsenic compounds remain in use, trace amounts of arsenic can be present in the poultry litter and can potentially be emitted to the air when the poultry litter is combusted. Accordingly, the levels of arsenic present in poultry litter have been compared numerically with arsenic levels present in traditional fuels.

Contaminants Warranting Qualitative Contaminant Comparisons

Except for nitrogen (N), chlorine (Cl), sulfur (S), and arsenic (As) which were discussed above, Fibrominn has determined that for all other contaminants and groups of contaminants, the contaminant levels present in its poultry litter can be reasonably assumed comparable to levels in traditional fuels. Examples of such other contaminants include halogens (other than Cl addressed above), metals classified by volatility (other than As addressed above), volatile and semi-volatile organic compounds, PCBs, and dioxin/furan precursors. Fibrominn has based its determination of comparable contamination levels for pollutants other than N, Cl, S, and As on its expert knowledge of the properties of poultry litter and poultry-growing practices.

With the exception of N, Cl, S, and As, it is reasonable to assume that Fibrominn's poultry litter does not have the potential to contain significant levels of any other regulated contaminant. This conclusion is based on assessing the two components of poultry litter discussed above, bedding material and excreted manure. It was noted previously that bedding material is categorized by EPA as clean cellulosic biomass which is inherently low-contaminant material. Also as noted, poultry manure derives from feed that is formulated mostly from grains and processed grains, all of which EPA considers to be clean cellulosic biomass materials. Therefore, with the exception of N, Cl, S, and As, qualitative assessment of contaminant levels in poultry shows that Fibrominn's poultry litter should contain no other regulated

contaminants at levels that would be higher than levels present in traditional fuels. Nonetheless, where data specific to poultry litter exist, Fibrominn has undertaken numerical contaminant comparisons with traditional fuels for additional contaminants beyond N, Cl, S, and As. Finally, because potential concerns over mercury and dioxins/furans ("dioxin") often arise whenever an alternative fuel is combusted, further assessment was made for mercury and dioxins/furans. In the case of mercury, there were data available to make limited numeric contaminant comparisons.

Fuels the Fibrominn Plant is Designed to Burn

As noted previously, EPA has stated that contaminant comparisons between a given secondary material and traditional fuel materials can be made for any traditional fuel material that the unit is designed to burn, whether or not the combustion unit is permitted to burn that traditional fuel. In addition, EPA guidance indicates that "designed to burn" also considers the adequacy of the fuel feed mechanism for getting the material into the combustion unit, as well as the need to ensure that the material is well mixed during combustion and that the combustion temperature is maintained within unit specifications. [78 FR 26, pp.9136, 9150]

The Fibrominn plant uses a standard spreader-stoker grate boiler system, with design enhancements to enable firing poultry litter as the principal fuel (e.g., grate ash management). The principal fuel, poultry litter, is mixed with secondary biomass in the enclosed fuel hall by overhead hydraulic cranes. If necessary, the mixed fuel is minimally mechanically processed to break down any clumps of material. The fuel is then moved using a standard conveyor belt into the combustion unit.

While the Fibrominn plant was specifically designed to use poultry litter as the principal fuel, its standard stoker combustion technology and simple fuel handling system, inherently enable the combustion of a wide variety of solid fuel materials, as long as the fuel "particle size" is adequately small. Stoker boilers are specifically noted for their fuel flexibility. Besides poultry litter, the design of the Fibrominn plant would enable effective performance using the following traditional fuels: solid fossil fuels (coal, petroleum coke), tire-derived fuel (TDF), and many forms of "clean cellulosic biomass," as defined by EPA. Examples of serviceable biomass fuels include wood chips, crop residue (e.g. corn stover, alfalfa stems), and byproducts of ethanol natural fermentation processes, notably distillers dried grains with solubles (DDGS). Accordingly, Fibrominn has compared contaminant levels present in its poultry litter fuel with contaminant levels present in the traditional fuels, coal, petroleum coke, TDF, woody biomass, DDGS, corn stover, and alfalfa stems.

Contaminant Comparisons

Fibrominn has assembled extensive test data on the contaminant levels present in poultry litter for comparison with contaminant levels present in traditional fuels. Historically, to inform the design effort for its power plant, Fibrominn had sponsored extensive testing of the poultry litter generated regionally in Minnesota that now constitutes its fuel supply. Fibrominn has supplemented its own substantial data base of the contaminant levels in poultry litter with additional data from the literature. These databases on contaminant levels in poultry litter are summarized in Table 1, at the end of this letter.

Fibrominn prepared tabular comparisons between contaminant levels present in poultry litter and contaminant levels present in a variety of traditional fuels as follows:

- Contaminants Present in Poultry Litter vs. Fossil Fuels (Coal, Petroleum Coke). Please refer to Table 2.
- Contaminants Present in Poultry Litter vs. Tire-Derived Fuel (TDF). Please refer to Table 3.
- Contaminants Present in Poultry Litter vs. Clean Cellulosic Biomass (Wood Fuel, DDGS, Corn Stover, Alfalfa Stems). Please refer to Table 4.

Results of the contaminant comparisons are presented below.

Nitrogen (N)

Manures, as highly-organic materials, are inherently high in N content. This includes poultry manure, which is one of two materials of which poultry litter is comprised, the other being bedding material (e.g., wood shavings). As shown in Table 1, the N content of poultry litter, as received, averages about 3%, and ranges from approximately 1% to 6%. The N content for Fibrominn's poultry litter (average and range) is slightly lower than the literature values of N in poultry litter.

Comparing the N level in poultry litter (as received) with the N levels in traditional fuels (Tables 2 to 4), results in the following observations:

- The average N level in poultry litter (~3%) is higher than the average levels in coal (~1.5%), TDF (0.36%), wood fuel (0.35%), corn stover (0.61%), and alfalfa stems (1.0%). However, the average N level in poultry litter (~3%) is lower than the average level in DDGS (~5% dry basis, ~4% as received). Note that Fibrominn tested DDGS to support design of the boiler, and hence, considered DDGS specifically to be one of the biomass fuels that the plant would be designed to burn. The Fibrominn test data for DDGS are included in Table 4.

- The range of N levels in poultry litter (~1% to 6%) is consistent with the ranges in coal (~1 to 5.4%) and DDGS (4.5 to 5.5%), but greater than the range for pet coke (1% to 2.6%), TDF (0.24% to 0.49%), and wood fuel (0.02% to 4%).

To summarize, the average N level in poultry litter is higher than in most traditional fuels, except for at least one, DDGS, which has a higher average N level than poultry litter. However, the range of N levels in poultry litter is consistent with those of both coal and DDGS. Notably, DDGS is a biomass material the properties of which were tested and explicitly considered in the design of the Fibrominn plant's boiler system. It is concluded that, on balance, considering mean and range values of N, the N level in the poultry litter combusted by Fibrominn is comparable to the N levels present in the traditional fuels, coal and DDGS.

In the specific case of Fibrominn's poultry litter fuel and combustion system, "total nitrogen" may not be an appropriate contaminant to utilize for the purpose of contaminant comparisons with traditional fuels. Fibrominn's poultry litter material is demonstrated to have high N levels, that while comparable to the traditional fuels, coal and DDGS, are numerically higher than in most traditional fuels. However, functionally, the N level in poultry litter *that is available for conversion to NOx via combustion* may not be higher than in additional traditional fuels beyond coal and DDGS. EPA has made a case-specific determination that total N is not an appropriate contaminant to consider in the specific case of a high-nitrogen organic material, when that material is burned in a stoker boiler system equipped with a Low NOx firing system that includes Low-NOx Burners and Overfire Air. EPA's determination was in response to a petition to EPA, in which the petitioner sought a non-waste determination for dried municipal sewage sludge (biosolids) having a high N content of ~5% to 7% (dry basis), when the biosolids are co-fired with coal in a stoker boiler. The petitioner had argued that most of the N in biosolids is in the organic form (as ammonia, or converts to ammonia) and under the combustion conditions commensurate with a Low NOx firing system (i.e., lower oxygen level and lower flame temperature), the ammonia-related N will not convert to NOx, but rather, may suppress its formation. The petitioner concluded that the organic N present in the biosolids is not a contaminant, as it does not convert to NOx emissions during combustion. As summarized below, EPA stated its concurrence that in the petitioner's specific circumstances, total N is not an appropriate contaminant to consider:*

> "Regarding nitrogen, the processed biosolids have somewhat higher levels of total nitrogen than coal. However, as you argue in your September 9, 2011 letter, total nitrogen is not an appropriate way to assess this contaminant - in *your specific situation* - that will form NOx during combustion. Specifically, you note that ammonia and organic nitrogen, which will be rapidly converted into ammonia early in the combustion process, should not be considered as contaminants provided the combustion unit has a Low NOx firing system (i.e., Low NOx burners with Overfire Air). You also state that the majority of nitrogen in the processed biosolids is in fact ammonia or organic nitrogen. Due to the oxygen-deficient nature and flame temperatures characteristic of Low NOx firing systems, introducing ammonia into the combustion chamber via

the processed biosolids will actually *reduce* NOx emissions. This would happen as the ammonia reacts with existing NOx – always present in some amount due to nitrogen's presence in air – to form nitrogen gas and water. As such, we agree that total nitrogen is not an appropriate contaminant to consider for your processed biosolids, but this finding only applies in situations where the combustion unit receiving the fuel is equipped with a Low NOx firing system. This is the case at [the petitioner's combustion unit]."

* US EPA, 2012. Letter dated March 16, 2012 from James Berlow (EPA) to Fadi Mourad (DTEE) regarding biosolids as a non-waste material under the 40 CFR Part 241 regulations.

Notably, Fibrominn believes that the conclusion EPA made above for combustion of biosolids in a stoker boiler equipped with a Low NOx system also applies case-specifically to Fibrominn's combustion of poultry litter in the same type of combustion system. Like biosolids having a high N content (5% to 7%, dry basis), poultry litter has a high N level (~1% to 6%, as received). As with the biosolids case, the N present in the manure fraction of the poultry litter is mostly in the organic form of N. In addition, as with the biosolids combustion case, Fibrominn combusts its poultry litter in a spreader-stoker boiler equipped with the same Low NOx firing system; i.e., Low NOx burners plus Overfire Air. Hence, it is reasonable to assert that, as with the biosolids combustion case, the organic N content of Fibrominn's poultry litter is unlikely to convert to NOx upon combustion. Accordingly, total N may not be an appropriate way to define N as a contaminant in the case of Fibrominn's poultry litter combustion, for the same reason EPA agreed this to be true for biosolids combustion in an analogous case-specific setting.

In conclusion, Fibrominn's poultry litter material is demonstrated to have high N levels; however, on balance, those levels are comparable to the traditional fuels, coal and DDGS. While comparable with N levels in coal and DDGS, the N levels in poultry litter are numerically higher than in most traditional fuels. However, the N level in Fibrominn's poultry litter *that is available for conversion to NOx via combustion* may not be higher than the N levels in some other traditional fuels beyond coal and DDGS. This is because the N present in the manure component of the poultry litter is largely in the organic form, which is unlikely to convert to NOx in Fibrominn's specific combustion system, a stoker boiler equipped with Low NOx burners and Overfire Air control. Hence, in the specific case of Fibrominn's poultry litter fuel and combustion system, total N may not be an appropriate way to define N as a contaminant.

Chlorine (Cl)

As shown in Table 1, the Cl content of poultry litter, as received, averages about 0.4%, and ranges from approximately 0.1% to 1%. The Cl content for Fibrominn's poultry litter (average and range) is consistent with the literature values of Cl in poultry litter.

Comparing the Cl level in poultry litter (as received) with the Cl levels in traditional fuels (Tables 2 to 4), results in the following observations:

- The average Cl level in poultry litter (~0.4%) is higher than the average levels in coal (~0.1%), pet coke (0.02%), TDF (0.11%), and wood fuel (0.026%), and marginally higher than the average Cl level in DDGS, for which literature values for the average range as high as 0.3%. However, the average Cl level in poultry litter (~0.4%) is comparable with literature values reported for the average Cl level in corn stover (0.7%, 0.6%, 0.2%, dry basis) and alfalfa stems (0.5%, 0.27%, 0.03%, dry basis).

- The range of Cl levels in poultry litter (~0.1% to 1%) is consistent with the ranges in coal (ND% to 0.91%) and TDF (~0.01% to 0.7%). The range of Cl levels in poultry litter (~0.1% to 1%) is marginally greater than in wood fuel (ND% to 0.54%, dry basis) and greater than the range in pet coke (0.0007% to 0.3%). Literature data were not found regarding the ranges of Cl levels in DDGS, corn stover, or alfalfa stems.

To summarize, the average Cl level in poultry litter is comparable with average levels found in corn stover and alfalfa stems, which are materials that EPA includes under the category of clean cellulosic biomass. In addition, the range of Cl levels in poultry litter is consistent with the ranges for both coal and TDF. It is concluded that, on balance, the Cl levels present in Fibrominn's poultry litter fuel are comparable to levels present in four traditional fuels: coal, TDF, corn stover, and alfalfa stems.

Fluorine (F)

As noted previously, fluorine (F) is one of the contaminants for which Fibrominn, based on expert knowledge and experience with the composition and handling of poultry litter, has determined that poultry litter is unlikely to contain significant levels. The litter is comprised of digested poultry feed and poultry bedding (clean wood shavings) and there is no known mechanism by which significant amounts of fluorinated compounds would be present in those materials.

The only data Fibrominn found on F levels present in poultry litter is the limited test data that Fibrominn generated itself (14 tests total). As shown in Table 1, the Fibrominn poultry litter had an average F level of 0.02% and a range of 0.01% to 0.05%. Except for coal and wood fuel, Fibrominn has found little literature data on the ranges of F found in traditional fuel materials. The limited test data available for poultry litter indicates that the F level in poultry litter, although very small, may potentially be slightly higher than levels present in coal and wood fuel (Tables 2 and 4). However, for poultry litter, wood fuel, and coal, the upper end of the range of F concentrations is a very small amount in each case; i.e., all three materials have a maximum concentration of F in the range of 0.013% to 0.05%. In addition, because of the

limited F data available for poultry litter, the indicated differences in F levels for litter versus coal and wood fuel may not be statistically meaningful. Finally, if the poultry litter is compared with coal (Table 2) for the contaminant group, "halogens (Cl + F)," it is clear that the range of halogen concentrations for poultry litter (~0.1% to 1%) is comparable with the range for coal (ND% to 0.93%).

In conclusion, based on expert knowledge and experience with the composition and handling of poultry litter, Fibrominn has determined that poultry litter is unlikely to contain significant levels of F. Data are limited for assessing the average and range of F levels present in poultry litter and in traditional fuels except for wood fuel and coal. An assessment of the limited available data indicates that poultry litter and coal have comparable ranges for the contaminant group, halogens, which includes both F and Cl.

Sulfur (S)

As shown in Table 1, the S content of poultry litter, as received, averages about 0.5%, and ranges between approximately 0.13% to 1.1%. The S content for Fibrominn's poultry litter (average and range) is marginally lower than the literature values of S for poultry litter.

Comparing the S level in poultry litter (as received) with the S levels in traditional fuels (Tables 2 to 4), results in the following observations:

- The average S level in poultry litter (~0.5%) is lower than the average levels in coal (~1.36%), pet coke (4.9%), and TDF (1.56%), and marginally lower than in DDGS (~ 0.6% to 0.8%).
- The range of S levels in poultry litter (0.13% to 1.1%) is less than the ranges in coal (~1 to ~6%), pet coke (~0.5% to ~8%), and TDF (0.9% to 2.8%).

Hence, the S level present in Fibrominn's poultry litter fuel is less than levels present in coal, petroleum coke, and TDF, and is likely marginally lower than average levels in DDGS.

Arsenic (As)

As discussed previously above, some poultry growers add a small amount of an arsenic compound to poultry drinking water or poultry feed to prevent parasitic infections in the birds. Accordingly, trace amounts of arsenic can be present in the poultry litter and can potentially be emitted to the air when the poultry litter is combusted. The most commonly used arsenic compound for poultry parasite control had historically been Roxasone. An academic study found that poultry litter from chickens receiving feed *not* containing Roxasone had arsenic present in the litter at a concentration of ~1 ppm; while chickens receiving feed with Roxasone had arsenic concentrations in the litter ranging from ~3 ppm to ~80 ppm.[+] Roxasone's manufacturer stopped distribution of the product to the poultry industry prior to 2012; however, some poultry growers use another compound containing arsenic. Because some

growers still use anti-parasite compounds containing arsenic, the levels of arsenic present in poultry litter have been compared numerically with arsenic levels present in traditional fuels.

[+]Fisher, Daniel et al., University of Maryland, 2011. "The Environmental Concerns of Arsenic Additives in Poultry Litter: A Literature Review," December 1, 2011. Prepared in response to a request from the Maryland General Assembly.

As shown in Table 1, the arsenic content of poultry litter, as received, averages ~14 ppm in general, and ranges between approximately 0.13 to 41 ppm. This is based on test data for Fibrominn's poultry litter as well as on data from the literature. Note that the upper end of that range of arsenic concentration is consistent with the upper end of the range cited above for litter derived from chickens receiving Roxasone in their feed. *Notably, the arsenic content for Fibrominn's poultry litter is substantially lower than levels based on the literature.* The Fibrominn poultry litter tested to have arsenic levels averaging ~0.1 ppm and ranging from ~0.2 to ~3 ppm. It is likely that the higher levels of arsenic in litter as taken from the literature are reflective of levels tested when Roxasone was still in common use. The much lower arsenic values found in Fibrominn's poultry litter are consistent approximately with levels found in litter resulting from poultry not receiving Roxasone. It is likely, however, that some poultry growers supplying litter to Fibrominn still use an anti-parasite additive that contains some arsenic, although not the additive, Roxasone.

Comparing the arsenic levels in poultry litter (as received) with the arsenic levels in traditional fuels (Tables 2 to 4), results in the following observations:

- Considering the entire data base (Fibrominn data and literature values), the average arsenic level in poultry litter (~14 ppm) is somewhat greater than in coal (~8 ppm), TDF (~4 ppm), and wood fuel (~6 ppm). However, considering only the test data for the poultry litter used as fuel at the Fibrominn plant, the average arsenic level (~1 ppm) is somewhat lower than the average levels for coal (~8 ppm), TDF (~4 ppm), and wood fuel (~6 ppm).

- Considering the entire data base for poultry litter (Fibrominn data and literature values), the range of arsenic levels in poultry litter (0.1ppm to 41ppm) is less than the ranges in coal (~ND to 174 ppm) and wood fuel (ND to 298 ppm). For Fibrominn litter only, the range of arsenic levels (~0.2 ppm to 3.2 ppm) is two orders of magnitude less than the ranges for coal and wood fuel.

In summary, the arsenic level present in Fibrominn's poultry litter fuel is less than levels present in wood fuel and coal, and the arsenic level in poultry litter in general (considering literature values), is comparable, on balance, with levels in wood fuel and coal.

Mercury (Hg)

There is no mechanism by which mercury compounds in significant quantities would be added to the poultry feed or to the clean cellulosic biomass material that serves as bedding material. Therefore, there is no basis apparent for expecting elevated mercury levels in the poultry litter. While significant mercury levels are not reasonably expected in poultry litter, potential concerns over mercury emissions often arise whenever an alternative fuel is combusted. Accordingly, numeric contaminant comparisons were made with traditional fuels using the limited available data for mercury levels in poultry litter.

Fibrominn had samples of poultry litter from three of its suppliers tested for mercury and the results showed no mercury present at a detection level of 0.05 ppm. [Galbraith Laboratories, Inc., Laboratory Report to T. Walmsley, Fibrowatt LLC, dated May 23, 2001] The actual level of mercury may be lower than the non-detection level of 0.05 ppm, given that achieving even lower detection limits for mercury, specifically in organic substrates, is technically challenging.

From Table 1, the literature values for mercury present in poultry litter are higher than for Fibrominn's tested poultry litter. The literature values shown in Table 1 indicate an average mercury concentration of 0.12 ppm for poultry litter and a range up to 0.25 ppm. From Tables 2 through 4, the upper end of the range of mercury levels in coal (1.0 ppm) and pet coke (0.5 ppm) is higher than for poultry litter (0.25 ppm), and the upper end of the ranges for TDF (0.33 ppm) and wood fuel (0.2 ppm) are about the same as poultry litter. It is concluded that the mercury level present in Fibrominn's poultry litter is likely non-detectable, and in any case, is comparable with levels found in wood fuel and TDF.

Dioxins/Furans

The precursors for formation of dioxin are thought to be chlorine, certain combustion-related organic compounds, and metal catalysts such as copper. The presence of chlorine in a fuel material, in and of itself, is not a predictor of potential dioxin emissions. While poultry litter contains chlorine, it does not have the required organic-compound or metal catalyst precursors to form elevated levels of dioxin when the poultry litter is combusted in a modern power plant. By contrast, for example, municipal solid waste does have all required precursors for formation and emission of dioxins/furans when the material is combusted. Indicative of the fact that poultry litter does not contain the requisite contaminant precursors for significant dioxin formation are the results of dioxins/furans emissions testing recently performed at Fibrominn. Testing performed in 2012 indicated the emission rate of Total Dioxins/Furans to be 0.12 ng/dscm @ 7% O2. [Eagle Mountain Scientific, Inc., Test Report to Fibrominn LLC, May 8-10, 2012] The tested emission rate is well below any EPA Section-129 Emission Guideline or Section 112 MACT standard that is potentially applicable to the Fibrominn Facility. Notably, the very-low tested emission rate was achieved at Fibrominn without the need to have incorporated dioxin-targeted

emission controls (i.e., activated carbon injection) that are standard at municipal waste combustors, for example.

Other Contaminants

As discussed previously above, with the exception of N, Cl, S, and As, Fibrominn believes that its poultry litter contains no other regulated contaminants at levels that could potentially be higher than levels present in traditional fuels. Fibrominn has reasonably based this conclusion on its expert knowledge of poultry growing practices, poultry litter composition, and litter handling practices. While Fibrominn believes this to be a sufficient contaminants comparison demonstration for contaminants other than N, Cl, S, and As, it has nonetheless undertaken numerical contaminant comparisons with traditional fuels for additional contaminants, where data specific to poultry litter was available to enable this. Limited data on contaminant levels in poultry litter were also found to be available for a number of metals beyond the metals, arsenic and mercury, already addressed above. Contaminants comparisons are summarized below for those metals, based on the limited data available. Results corroborate Fibrominn's qualitative determination, based on expert knowledge, that contaminants besides N, Cl, S, and As are not present in poultry litter at levels that are potentially higher than levels found in traditional fuels.

Contaminant Comparisons for Metals Based on Limited Available Data

Metal	Comparison of Poultry Litter with Traditional Fuels (Tables 2, 3, 4)
Arsenic (As)	Contaminant comparison was made separately above.
Beryllium (Be)	Contaminant comparison data not available for poultry litter.
Cadmium (Cd)	Levels in litter are approximately comparable with coal, TDF, and wood.
Chromium (Cr)	Levels in litter are less than for coal, pet coke, TDF, and wood fuel, based on Fibrominn data for litter. Range for litter is comparable to wood fuel based on literature values for litter.
Cobalt (Co)	Levels in litter are less than for coal, TDF, and wood fuel.
Lead (Pb)	Levels in litter are less than for coal, TDF, and wood fuel, based on Fibrominn data for litter. Range for litter is less than for TDF and wood fuel based on literature values for litter.
Manganese (Mn)	Levels for litter are less than for coal and TDF.
Mercury (Hg)	Contaminant comparison was made separately above.
Molybdenum (MO)	Contaminant comparison data not available for traditional fuels.
Nickel (Ni)	Range for litter is less than for coal and pet coke, and comparable to wood fuel.
Selenium (Se)	Levels for litter are less than in coal and are comparable, on balance, to levels in pet coke, TDF, and wood fuel.
Zinc (Zn)	Levels for litter are less than in TDF (no comparison data available for other traditional fuels).

5.0 CONCLUSIONS

Fibrominn has demonstrated that its poultry litter fuel meets all requirements for EPA to grant a non-waste determination under 40 CFR § 241.3(c). Specifically, Fibrominn has demonstrated that its poultry litter fuel has not been discarded and that it meets the fuel legitimacy criteria at 40 CFR § 241.3(d) as well as the related criteria at 40 CFR § 241.3(c)(1).

Fibrominn's Poultry Litter is not discarded; is managed as a valuable fuel product; and has a meaningful heating value for energy recovery.

The poultry litter that Fibrominn combusts as a fuel meets the legitimacy criterion for "managed as a valuable commodity" and hence, is not discarded. The poultry litter is managed specifically as a valuable fuel product from generation, through transport to Fibrominn, and receipt and storage of the poultry litter at Fibrominn just prior to combustion. The poultry litter is always procured from the poultry growers under contract and must meet a prescribed fuel specification by contract. Fibrominn always pays the generator a price for the poultry litter fuel. The poultry litter is always transported in fully-covered trucks and upon delivery to Fibrominn, is received, off-loaded, and stored in a fully-enclosed fuel hall prior to combustion. These measures are specifically intended to (1) preserve fuel quality by prohibiting weather-related moisture uptake and (2) to prevent contact between litter and the environment, and the resultant potential impacts to the air, water, or land. Under normal operations, the potential for environmental impacts during poultry litter transport and delivery is arguably less than with some traditional fuels such as wood chips and coal, which are routinely stored in piles outdoors prior to combustion. During infrequent plant outages, poultry litter contracted by Fibrominn may be temporarily stored at the transporter's facilities, indoors or outdoors, then delivered to Fibrominn when the plant comes back on line. The duration of such staged delivery is limited to a maximum of one to two months, specifically to ensure that the quality of the poultry litter fuel does not significantly degrade and in order to minimize the potential for runoff-related environmental impacts that could occur with longer-term storage.

The poultry litter that Fibrominn combusts as a fuel meets the criterion for having a "meaningful heat value" for energy recovery. The poultry litter that Fibrominn uses as a principal fuel has an "as fired" heating value (expressed as HHV) that is less than the EPA presumptive benchmark of 5,000 Btu/lb for meaningful heat recovery. While the heating value for poultry litter, as received, is less than EPA's benchmark, poultry litter burns autogenously in stoker boilers, and particularly at Fibrominn, when comprising the *majority* fraction of the fuel mix of litter and wood chips (50% to 75% poultry litter). Since 2007, Fibrominn has established a strong commercial operating record demonstrating that, with its stoker boiler system, it can combust poultry litter as the principal fuel autogenously (without using supplemental fuel), in turn, recovering meaningful energy cost-effectively and with high reliability, resulting in profitable sale of the energy. With poultry litter as its principal fuel, Fibrominn has combusted

350,000 to 450,000 tons per year of poultry litter as the principal fuel to generate over 400,000 MWh annually of electric power that is sold on the grid.

Contaminant levels in Fibrominn's poultry litter are comparable to or less than levels in traditional fuels.

As regards contaminant comparisons, EPA had expressed a generic concern regarding the levels of nitrogen (N) and chlorine (Cl) present in manures compared with traditional fuels. This would include the poultry manure component of poultry litter. Besides N and Cl, Fibrominn determined that sulfur (S) and arsenic (As) also warranted numerical contaminant comparisons with levels in traditional fuels. This determination was based on the fact that sulfur is present in poultry diets (and hence, in excreted manure) and that some poultry growers add an arsenic-based compound to poultry feed or water in small amounts to combat parasites. Contaminant levels in Fibrominn's poultry litter (as well as literature values) were compared with contaminant levels present in traditional fuels that Fibrominn's stoker boiler system is designed to burn: coal, petroleum coke, tire-derived fuel (TDF), wood chips, distillers dried grain with solubles (DDGS), corn stover, and alfalfa stems. The levels of N, Cl, S, and As present in the poultry litter that Fibrominn burns as a fuel were demonstrated to be at levels numerically comparable to or less than levels in traditional fuel materials. Summary conclusions resulting from the contaminant comparisons made for N, Cl, S, and As are presented below:

Summary Contaminant Comparisons for Nitrogen, Chlorine, Sulfur, and Arsenic

Contaminant	Comparison of Poultry Litter with Traditional Fuels (Tables 2, 3, 4)
Nitrogen (N)	• The *average* N level in poultry litter is less than the average level in DDGS, a clean cellulosic biomass fuel, as defined by EPA • The *range* of N levels in poultry litter is comparable, on balance, with the ranges present in the traditional fuels, coal and DDGS. • "Total N" may not be an appropriate way to define the contaminant for Fibrominn's poultry litter. The organic N in the litter does not likely convert to NOx emissions when the litter is burned in Fibrominn's specific boiler type: stoker boiler with a Low-NOx firing system.
Chlorine (Cl)	• The *average* Cl level in poultry litter is comparable with the average levels in corn stover and alfalfa stems, which are clean cellulosic biomass fuels, as defined by EPA • The *range* of Cl levels in poultry litter is comparable with the ranges present in the traditional fuels, coal and TDF.
Sulfur (S)	• The *average* S level in poultry litter is less than average values in the traditional fuels, coal, petroleum coke, TDF, and comparable with average level in DDGS. • The *range* of S levels in poultry litter is less than the ranges in the traditional fuels, coal, petroleum coke, and TDF.

Arsenic(As)	• Fibrominn's poultry litter has low levels of As compared with literature values for poultry litter nationally. • *Average* levels of As in Fibrominn's poultry litter are less than average values in the traditional fuels, wood, coal, and TDF. • The *range* of As values present in poultry litter in general (including literature values nationally) is comparable, on balance, with the ranges for coal and wood fuel.

In addition to N, Cl, S, and As, Fibrominn also determined that its poultry litter contains no other regulated contaminants at levels that would be higher than levels present in traditional fuels. Fibrominn had reasonably based this conclusion on its expert knowledge of poultry growing practices, poultry litter composition, and litter handling practices. While Fibrominn believed its qualitative analysis to be sufficient, it nonetheless performed numerical contaminant comparisons with traditional fuels for additional contaminants beyond N, Cl, S, and As, where data specific to poultry litter was available to enable this. Limited data on contaminant levels in poultry litter were found to be available for mercury and a number of other metals. Results of those contaminants comparisons corroborated Fibrominn's qualitative determination, based on expert knowledge, that contaminants besides N, Cl, S, and As do not have the potential to be present in poultry litter at levels higher than those found in traditional fuels.

6.0 PRECEDENT NON-WASTE DETERMINATION

Under its delegated regulatory authority, the North Carolina Department of Environment and Natural Resources (NCDENR) has made a case-specific determination in 2012 that poultry litter is not a solid waste when used as a fuel in a combustion unit.[#] Prestage Farms, Inc. applied for the non-waste determination for the poultry litter it plans to combust as a boiler fuel to recover saleable energy at its feed mill in North Carolina. NCDENR determined that the poultry litter in that case is not a solid waste when combusted because the poultry litter is ". . . . maintained within the control of the generator, and meets the fuel criteria provided in 40 CFR 241.3(d)(1)." The NCDENR determination that poultry litter meets the fuel legitimacy criteria is a directly relevant precedent with regard to the application Fibrominn makes here for a non-waste determination for its poultry litter fuel. While Fibrominn's poultry litter fuel is not maintained within the control of the generator, it was clearly demonstrated above that the litter has not been discarded. Accordingly, because Fibrominn's poultry litter also meets the fuel legitimacy criteria at 40 CFR 241.3(d), Fibrominn's poultry litter is a non-waste material, consistent with the non-waste determination made by NCDENR for the Prestage Farms poultry litter.

When Prestage Farms performed its contaminants comparisons, the contaminant levels in its poultry litter were reported on a dry basis, rather than on the basis EPA prefers and Fibrominn used – an as-received basis. Because of the significant technical differences in reporting bases, it

was not technically appropriate for Fibrominn to include Prestage's poultry-litter contaminant data in the literature data base when Fibrominn performed its contaminant comparisons.

North Carolina Department of Environment and Natural Resources (NCDENR), 2012. Letter from Donald van der Vaart (DENR) to John Prestage (Prestage Farms) dated July 19, 2012, Subject: Applicability Determination No. 1887 – Secondary Materials Determination. Accessed April 2013 at: http://daq.state.nc.us/permits/memos/prestage%20farms%20NHSM%20determination.pdf

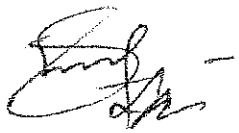
Fibrominn appreciates the Agency's efforts in reviewing this application for a non-waste determination. Please do not hesitate to contact me with any questions or should you need further information to facilitate your review. My contact information is:

- Shiv Srinivasan, Fibrominn Plant Manager (Shiv.Srinivasan@contourglobal.com; 320-297-0821).

Please also copy the following individuals on any email or written correspondence:

- David Minott, Arc5 Environmental Consulting (david.minott@arc5enviro.com);
- Scott Knudson, Briggs and Morgan (SKnudson@Briggs.com).

Sincerely,



Shiv Srinivasan,
Plant Manager
Fibrominn LLC

cc: MPCA via email –

- Trevor Shearen (trevor.shearen@state.mn.us)
- Richard Cordes (richard.cordes@state.mn.us)
- Steve Gorg (steven.gorg@state.mn.us)

Also -

- David Minott, Arc5 Environmental Consulting LLC (david.minott@arc5enviro.com)
- Scott Knudson, Briggs and Morgan (SKnudson@Briggs.com)

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Table 1: Contaminant Levels in Poultry Litter

		Fibrominn Poultry Litter- *As Rcvd. (1999 - 2002)* [1,2]			Literature - Poultry Litter - *As Rcvd* .[3]			Poultry Litter - *As Rcvd.*: Fibrominn[1,2] and Literature[3]		
	Units	No. of Samples	Average	Range	No. of Samples	Average	Range	No. of Samples	Average	Range
N, S, Halogens										
Nitrogen (N)	%	111	2.63	1.02 - 4.36	1,545	3.27	0.732 - 5.93	1,656	3.23	0.732 - 5.93
Sulfur (S)	%	111	0.38	0.16 - 0.70	1,419	0.54	0.133 - 1.11	1,530	0.53	0.133 - 1.11
Chlorine (Cl)	%	109	0.38	0.1 - 0.89	9	0.63	0.318 - 0.97	118	0.40	0.1 - 0.97
Fluorine (F)	%	14	0.02	0.01 - 0.05	--	--	--	14	0.02	0.01 - 0.05
Metal Elements										
Arsenic (As)	ppm	7	1.13	0.22 - 3.16	9	23.5	13.5 - 40.5	16	13.71	0.22 - 40.5
Beryillum (Be)	ppm	--	--	--	--	--	--	--	--	--
Cadmium (Cd)	ppm	--	--	--	16	1.46	0.068 - 4.39	16	1.46	0.068 - 4.39
Chromium (Cr)	ppm	8	1.19	0.19 - 1.82	9	75	8.5 - 230	17	40.27	0.19 - 230
Copper (Cu)	ppm	--	--	--	1,447	278	17.1 - 632	1,447	278	17.1 - 632
Lead (Pb)	ppm	8	0.55	0.09 - 1.07	14	20	0.8 - 70	22	12.93	0.09 - 70
Manganese (Mn)	ppm	--	--	--	1,448	0.794	0.249 - 1.54	1,448	0.794	0.249 - 1.54
Mercury (Hg)	ppm	3	< 0.05	< 0.05	3	0.195	0.105 - 0.25	6	<0.123[4]	<0.05 - 0.25
Molybdenum (Mo)	ppm	--	--	--	446	0.439	0.102 - 2.15	446	0.439	0.102 - 2.15
Nickel (Ni)	ppm	--	--	--	15	45	1.68 - 185	15	45	1.68 - 185
Selenium (Se)	ppm	8	0.76	0.21 - 0.99	3	0.00041	0.00034 - 0.00045	11	0.55	0.00034 - 0.99
Zinc (Zn)	ppm	--	--	--	1,454	346	76.9 - 664	1,454	346	76.9 - 664

References

[1]Fibrominn Poultry Litter, As Received - Test Data Summary for N, S, Cl, and HHV (1999 to 2002)

[2]Fibrominn LLC, 2001. "Fibrominn Fuel Sampling and Testing Program - Metals Analysis on the As-Received Samples," April 1, 2001 *and* Galbraith Laboratories, "Laboratory Report" to Fibrowatt LLC on

Tested Mercury in Poultry Litter Samples (05/23/2001)

[3]Barker et al., January 1994 (Rev. 2001). "Animal and Poultry Manure Production & Characterization," Tables 61 and 71 combined. Accessed March 2013 at http://www.bae.ncsu.edu/programs/extension/manure/awm/program/barker/a&pmp&c/cover_page_apmp&c.html

[4]Non-detect values were included in calculating the average and range.

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Table 2: Contaminant Comparisons - Poultry Litter Versus Fossil Fuels

		Poultry Litter - *As Received*						Coal - *Dry Basis* [4]				Pet Coke - *Dry Basis* [5]	
		Fibrominn Poultry Litter - *As Rcvd. (1999 - 2002)* [1,2]			Poultry Litter - *As Rcvd:* Fibrominn[1,2] & Literature[3]			All	EPA OAQPS		EPA - Literature		
	Units	No. of Samples	Average	Range	No. of Samples	Average	Range	No. of Samples	Average	Range	Range	Average	Range
N, S, Halogens													
Nitrogen (N)	%	111	2.63	1.02 - 4.36	1,656	3.23	0.732 - 5.93	17,000	1.51	1.36 - 5.4	--	--	1.0 - 2.6
Sulfur (S)	%	111	0.38	0.16 - 0.70	1,530	0.53	0.133 - 1.11	17,000	1.36	0.074 - 6.13	--	4.87	0.54 - 7.91
Chlorine (Cl)	%	109	0.38	0.1 - 0.89	118	0.40	0.1 - 0.97	17,000	0.099	ND - 0.908	--	0.02	0.0007 - 0.3
Fluorine (F)	%	14	0.02	0.01 - 0.05	14	0.02	0.01 - 0.05	17,000	0.006	ND - 0.0178	--	0.001	--
Metal Elements													
Arsenic (As)	ppm	7	1.13	0.22 - 3.16	16	13.71	0.22 - 40.5	17,000	8.2	ND - 174	0.5 -80	--	ND - 0.3
Beryillum (Be)	ppm	--	--	--	--	--	--	17,000	1.9	ND - 206	0.1 - 15	--	ND - 1.5
Cadmium (Cd)	ppm	--	--	--	16	1.46	0.068 - 4.39	17,000	0.6	ND - 19	0.1 - 3.0	--	0.00005 - 0.1
Chromium (Cr)	ppm	8	1.19	0.19 - 1.82	17	40.27	0.19 - 230	17,000	13.4	ND - 168	0.5 - 60	5.0	--
Cobalt (Co)	ppm	--	--	--	4	0.0019	0.0014 - 0.0029	17,000	6.9	ND - 25.2	0.5 - 30	--	--
Lead (Pb)	ppm	8	0.55	0.09 - 1.07	22	12.93	0.09 - 70	17,000	8.7	ND - 148	2 - 80	--	0.00009 - 0.6
Manganese (Mn)	ppm	--	--	--	1,448	0.794	0.249 - 1.54	17,000	26.2	ND - 512	5.0 - 300	--	2.4 - 4.0
Mercury (Hg)	ppm	3	< 0.05	< 0.05	6	<0.123[4]	<0.05 - 0.25	17,000	0.09	ND - 3.1	0.02 - 1.0	0.05	0.001 - 0.5
Molybdenum (Mo)	ppm	--	--	--	446	0.439	0.102 - 2.15	--	--	--	--	--	--
Nickel (Ni)	ppm	--	--	--	15	45	1.68 - 185	17,000	21.5	ND - 730	0.5 - 50	--	200 - 500
Selenium (Se)	ppm	8	0.76	0.21 - 0.99	11	0.55	0.00034 - 0.99	17,000	3.4	ND - 74.3	0.2 - 10	--	ND - 2.0
Zinc (Zn)	ppm	--	--	--	1,454	346	76.9 - 664	--	--	--	--	0.0005	--

References

[1]Fibrominn Poultry Litter, As Received - Test Data Summary for N, S, Cl, and HHV (1999 to 2002)

[2]Fibrominn LLC, 2001. "Fibrominn Fuel Sampling and Testing Program - Metals Analysis on the As - Received Samples," April 1, 2001 *and* Galbraith Laboratories, "Laboratory Report" to Fibrowatt LLC on Tested

Mercury in Poultry Litter Samples (05/23/2001)

[3]Barker et al., January 1994 (Rev. 2001). "Animal and Poultry Manure Production & Characterization," Tables 61 and 71 combined. Accessed March 2013 at http://www.bae.ncsu.edu/programs/extension/manure/awm/program/barker/a&pmp&c/cover_page_apmp&c.html

[4]EPA "Contaminant Concentrations in Traditional Fuels: Tables for Comparison." November 29, 2011.

[5]Tables 4.1 - 4.3. National Council for Air and Stream Improvement, Inc. (NCASI). 2005. Alternative Fuels Used in the Forest Products Industry: Their Composition and Impact on Emissions. Technical Bulletin No. 0906. Research Triangle Park, NC: National Council for Air and Stream Improvement, Inc.

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		Table 3: Contaminant Comparisons -- Poultry Litter Versus Tire-Derived Fuel							
		Poultry Litter - *As Received*						Tires - *Dry Basis*[4]	
		Fibrominn Poultry Litter - *As Rcvd. (1999 - 2002)*[1,2]			Poultry Litter - *As Rcvd.*: Fibrominn[1,2] & Literature[3]				
	Units	No. of Samples	Average	Range	No. of Samples	Average	*Range*	Average	Range
N, S, Halogens									
Nitrogen (N)	%	111	2.63	1.02 - 4.36	1,656	3.23	0.732 - 5.93	0.36	0.24 - 0.49
Sulfur (S)	%	111	0.38	0.16 - 0.70	1,530	0.53	0.133 - 1.11	1.56	0.86 - 2.8
Chlorine (Cl)	%	109	0.38	0.1 - 0.89	118	0.40	0.1 - 0.97	0.11	0.01 - 0.6483
Fluorine (F)	%	14	0.02	0.01 - 0.05	14	0.02	0.01 - 0.05	0.001	--
Metal Elements									
Arsenic (As)	ppm	7	1.13	0.22 - 3.16	16	13.71	0.22 - 40.5	3.82	0.58 - 17.52
Beryillum (Be)	ppm	--	--	--	--	--	--	0.03	0 - 0.17
Cadmium (Cd)	ppm	--	--	--	16	1.46	0.068 - 4.39	1.1	0.39 - 1.91
Chromium (Cr)	ppm	8	1.19	0.19 - 1.82	17	40.27	0.19 - 230	29.65	5.29 - 92.74
Cobalt (Co)	ppm	--	--	--	4	0.0019	0.0014 - 0.0029	253	105 - 400
Lead (Pb)	ppm	8	0.55	0.09 - 1.07	22	12.93	0.09 - 70	70.65	22.76 -154.5
Manganese (Mn)	ppm	--	--	--	1,448	0.794	0.249 - 1.54	460	63.2 - 1786
Mercury (Hg)	ppm	3	< 0.05	< 0.05	6	<0.123[4]	<0.05 - 0.25	0.056	0.01 - 0.328
Molybdenum (Mo)	ppm	--	--	--	446	0.439	0.102 - 2.15	--	--
Nickel (Ni)	ppm	--	--	--	15	45	1.68 - 185	30.95	4.69 - 86.54
Selenium (Se)	ppm	8	0.76	0.21 - 0.99	11	0.55	0.00034 - 0.99	0.71	0.0 - 4.0
Zinc (Zn)	ppm	--	--	--	1,454	346	76.9 - 664	14,501	12,000 - 24,400

References

[1]Fibrominn Poultry Litter, As Received - Test Data Summary for N, S, Cl, and HHV (1999 to 2002)

[2]Fibrominn LLC, 2001. "Fibrominn Fuel Sampling and Testing Program - Metals Analysis on the As - Received Samples," April 1, 2001 *and* Galbraith Laboratories, "Laboratory Report" to Fibrowatt LLC on Tested Mercury in Poultry Litter Samples (05/23/2001)

[3]Barker et al., January 1994 (Rev. 2001). "Animal and Poultry Manure Production & Characterization," Tables 61 and 71 combined. Accessed March 2013 at http://www.bae.ncsu.edu/programs/extension/manure/awm/program/barker/a&pmp&c/cover_page_apmp&c.html

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Table 4: Contaminant Comparisons -- Poultry Litter Versus "Clean Cellulosic Biomass"

		Poultry Litter - *As Received*						Wood & Biomass - *Dry Basis*[4]				DDGS[5] - *Dry Basis*			Corn Stover - *Dry Basis*	Alfalfa Stems - *Dry Basis*
		Fibrominn Poultry Litter- *As Rcvd.* (1999 - 2002)[1,2]			Poultry Litter - *As Rcvd.* - Fibrominn[1,2] & Literature[3]			All	EPA OAQPS		EPA - Literature	Literature				
	Units	No. of Samples	Average	Range	No. of Samples	Average	Range	No. of Samples	Average	Range	Range	No. of Samples (ref. A / ref. B...)	Average (ref. A / ref. B...)	Range (ref. A / ref. B...)	Literature Average	Literature Average
N, S, Halogens																
Nitrogen (N)	%	111	2.63	1.02 - 4.36	1,656	3.23	0.732 - 5.93	12,000	0.35	0.22 - 0.46	0.02 - 3.95	32/4	4.5[6]/4.75[7]/3.6[9]	4.5 - 5.4[6]/--	0.61[9]/0.13[9]	1.00[6]/1.78[9]
Sulfur (S)	%	111	0.38	0.16 - 0.70	1,530	0.53	0.133 - 1.11	12,000	0.07	ND - 0.61	ND - 0.87	32/4	0.61[6]/0.77[7]/0.64[9]	0.31 - 1.05[6]/-	0.01[8]/0.01[9]	0.02[8]/0.13[9]
Chlorine (Cl)	%	109	0.38	0.1 - 0.89	118	0.40	0.1 - 0.97	12,000	0.026	ND - 0.54	ND - 0.26	2/--	0.18[7]/0.30[9]/0.13[9]	-- / --	0.60[9]/0.22[10]/ 0.23[10]/0.72[10]	0.03[9]/0.27[9]/0.50[10]
Fluorine (F)	%	14	0.02	0.01 - 0.05	14	0.02	0.01 - 0.05	12,000	0.003	ND - 0.0128	ND - 0.03	--	--	--	--	--
Metal Elements													No Data		No Data	No Data
Arsenic (As)	ppm															
Beryllium (Be)	ppm															
Cadmium (Cd)	ppm	7	1.13	0.22 - 3.16	16	13.71	0.22 - 40.5	12,000	6.3	ND - 298	ND - 6.8					
Chromium (Cr)	ppm	--	--	--	--	--	--	12,000	0.3	ND - 10	--					
Cobalt (Co)	ppm	--	--	--	16	1.46	0.068 - 4.39	12,000	0.6	ND - 17	ND - 3.0					
Lead (Pb)	ppm	8	1.19	0.19 - 1.82	17	40.27	0.19 - 230	12,000	5.9	ND - 340	ND - 130					
Manganese (Mn)	ppm	--	--	--	4	0.0019	0.0014 - 0.0029	12,000	6.5	ND - 213	ND - 24					
Mercury (Hg)	ppm	8	0.55	0.09 - 1.07	22	12.93	0.09 - 70	12,000	4.5	ND - 229	ND - 340					
Molybdenum (Mo)	ppm	--	--	--	1,448	0.794	0.249 - 1.54	12,000	302.0	ND - 15,800	7.9 - 840					
Nickel (Ni)	ppm	3	< 0.05	< 0.05	6	<0.123[4]	<0.05 - 0.25	12,000	0.03	ND - 1.1	ND - 0.2					
Selenium (Se)	ppm	--	--	--	446	0.439	0.102 - 2.15	--	--	--	--					
Zinc (Zn)	ppm	--	--	--	15	45	1.68 - 185	12,000	2.8	ND - 175	ND - 540					
		8	0.76	0.21 - 0.99	11	0.55	0.00034 - 0.99	12,000	1.1	ND - 9	ND - 2.0					

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[1]Fibrominn Poultry Litter, As Received - Test Data Summary for N, S, Cl, and HHV (1999 to 2002)

[2]Fibrominn LLC, 2001. "Fibrominn Fuel Sampling and Testing Program - Metals Analysis on the As - Received Samples," April 1, 2001 *and* Galbraith Laboratories, "Laboratory Report" to Fibrowatt LLC on Tested Mercury in Poultry Litter Samples (05/23/2001)

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[7]Morey, R.V. et al., 2009. "Fuel Properties of Biomass Feed Streams at Ethanol Plants." Applied Engineering in Agriculture, Vol. 25, No. 1, pp. 57 - 64.

[8]Jenkins, Bryan et al., 1985. "Thermochemical Properties of Biomass Fuels," California Agriculture, May-June 1985, Table 1.

[9]Fibrominn LLC, "Fibrominn Composite Fuel EvaluationBased on 50 MW Export and Average Fuel Characteristics," April 10, 2001. (Note: Data on *As Received* basis)

[10]Tilman, David et al., 2008. "Chlorine in Solid Fuels fired in Pulverized Coal Boilers - Sources, Forms, Reactions and Consequences: A Literature Review."